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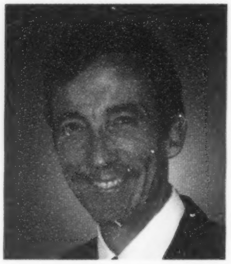
HP Converged Infrastructure and the Cloud



Duncan Campbell

VP OF MARKETING, HP CONVERGED INFRASTRUCTURE
HEWLETT-PACKARD COMPANY

Duncan Campbell is the leader of the Enterprise Group Solutions Marketing team. In this role, Campbell is responsible for the Marketing Strategy and the Solutions content development for: HP Converged Infrastructure, Application Transformation, Information Optimization, Security and Risk Management, Mobility and SMB. Campbell brings more than 25 years of enterprise and midmarket marketing experience to this leadership team.

The essential foundation for any cloud deployment

Duncan Campbell, vice president of worldwide marketing for converged infrastructure at HP Enterprise Group, shares with Computerworld his insights on the HP Converged Infrastructure.

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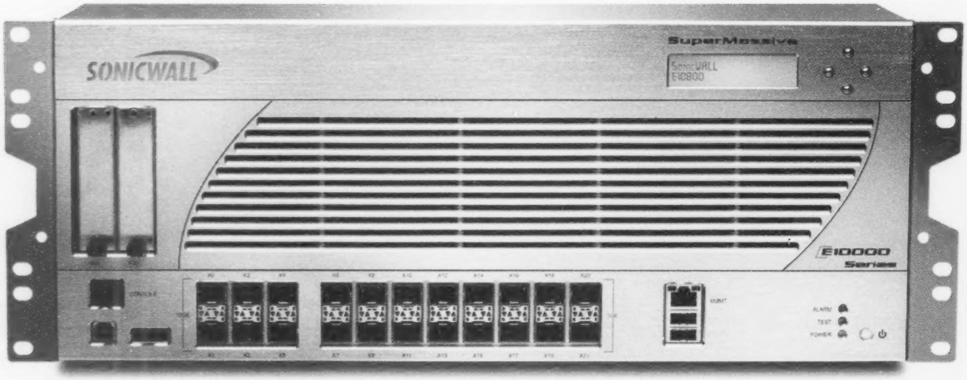

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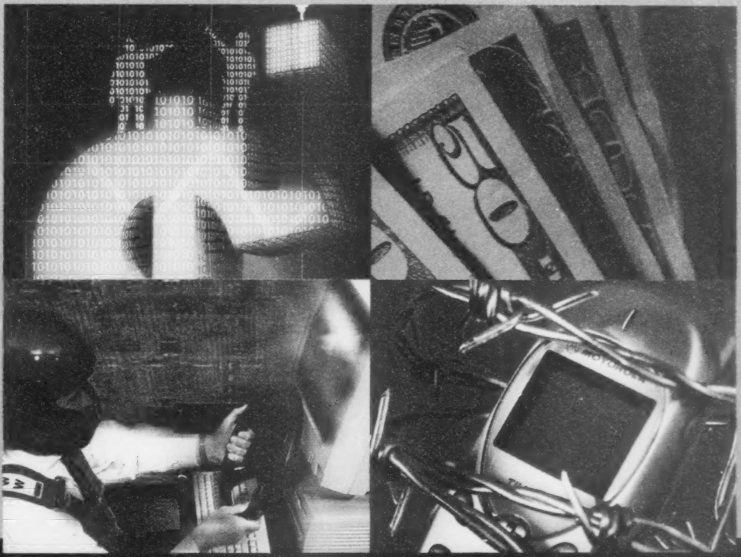

Forecast 2013

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Building a Better Budget

18 The fiscal picture is looking rosier in many IT shops across the country. But lessons learned from the recession are not easily forgotten and **smart IT executives are carefully constructing their budgets for 2013** with big-payback projects in mind.

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IT CAREERS

GM 'Insources,' Set to Hire 10,000 IT Pros

GENERAL MOTORS plans to discontinue outsourcing arrangements and pull most of its IT work back in-house — a move the automaker said will result in the hiring of 10,000 IT professionals worldwide over the next three to five years.

As part of its "insourcing" plan, GM will open several "innovation centers" around the country, including one in Austin that will employ 500 people. The company said it chose Austin as a site for one of the facilities because the Texas capital is home to people with relevant skills. A spokesman said GM won't specify the number of innovation centers it hopes to open.

The IT reorganization is being led by Randy Mott, who was named GM's CIO in February. A former CIO at Hewlett-Packard and Dell, Mott also spent more than two decades at Wal-Mart in a number of IT roles, including CIO.

"We plan to rebalance the employment model over the next three years so the majority of our IT work is done by GM employees focused on extending new capabilities," Mott said in a statement.

The company is seeking software engineers, business analysts, messaging engineers, analysts, developers, testers, planners, infrastructure architects and other IT professionals. Also wanted: People with expertise in specific platforms, including Maximo asset management tools, Tableau analytics software and PeopleSoft.

GM has relied heavily on outsourcers to run its global IT. In 2006, for instance, the company announced it had signed outsourcing contracts valued at around $7 billion.

– Patrick Thibodeau

IT INDUSTRY

IT Growth Seen – If Washington Fosters Stability

JPMorgan, Forrester and IDC all recently lowered their IT spending forecasts for the year. Gartner did so in June.

Analysts don't agree on the extent of the problem, but most broadly blame Europe and a slowdown in China, along with a stronger U.S. dollar. The catchword is *uncertainty*.

JPMorgan warns that uncertainty related to U.S. government spending, both before and after the November elections, could weigh heavily on the IT sector.

Forrester is more blunt. The U.S. is experiencing an improving housing market, growth in the auto industry, low interest rates and lower energy prices. These forces could set the stage for stronger economic growth, "if politicians don't blow it," argues Forrester analyst Andrew Bartels in a new report.

Washington must set policies that lead to stabilization, analysts said.

For now, most analysts agree that there will be some IT spending growth, but it may not be as strong as they once expected. Forrester recently lowered its forecast to 1.3% from a January prediction of 5.4%. IDC is the most bullish, forecasting 6% growth. It notes that software spending is particularly strong.

But JPMorgan warned that up to 40% of the growth is at risk if spending slows as a result of economic turmoil.

- PATRICK THIBODEAU

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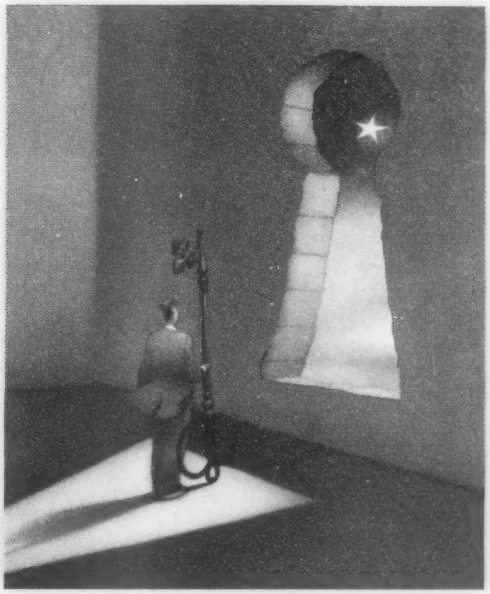

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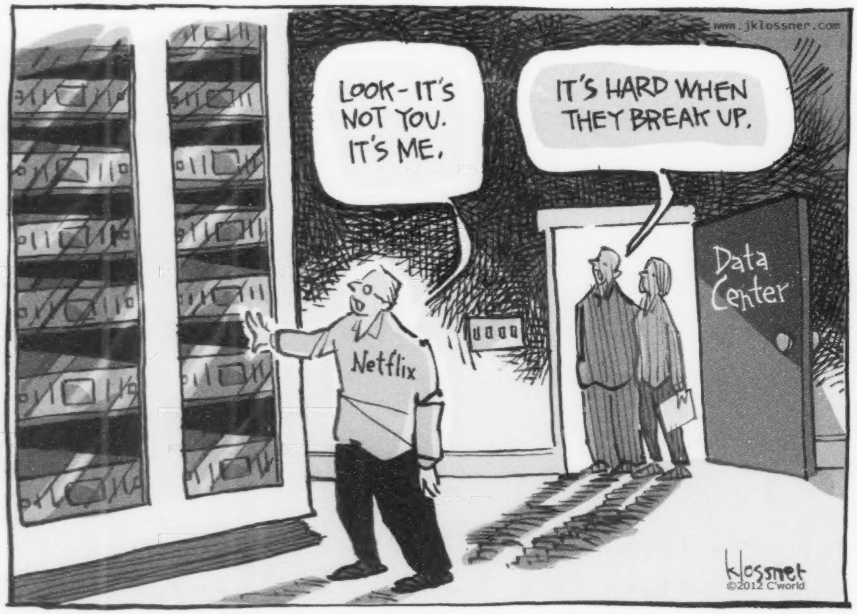
By John Klossner



SMARTPHONES

iPhone 5: Pros and Cons in the Enterprise

IF THE iPhone 5 sells as well as analysts predict, its impact on IT shops wrestling with the bring-your-own-device (BYOD) trend could be dramatic.

According to some analysts, enterprise use of the new iPhone, which is capable of connecting to 4G LTE networks, will increase security risks and result in higher data charges on cellphone bills. On the other hand, some IT managers said the iPhone 5 will be manageable, in terms of both security and cost. One CIO said it might even be a boon to worker productivity.

"Business runs in real time, and workers want to do things fast. The iPhone 5's LTE can provide that real-time capability," said SAP CIO Oliver Bussmann. "The future is a mobile one, and we're constantly looking at any desktop app that we can move to mobile."

Bussmann said he supports more than 60,000 workers globally and manages more than 40,000 smartphones and tablets. Around 13,000 of the smartphones are iPhones. Like many large corporations, SAP negotiates flat data rates with carriers, Bussmann said.

Terex, a global manufacturer with 1,000 smartphone users, already supports the iPhone and Android phones under a BYOD framework. "The iPhone 5 won't change our thinking," said Terex CIO Greg Fell. "We'll keep buying them."

Alex Yoyn, assistant director of technology for West Virginia University, said some of the college's 30,000 students have expressed interest in the iPhone 5. But the main campus in Morgantown, W.Va., doesn't have LTE service, which diminishes the new device's appeal.

While some CIOs seem unconcerned, some analysts cautioned that the new iPhone could cause problems for businesses. For example, Rob Enderle, an analyst at the Enderle Group, said the ease of sharing photos with the new device could lead to pictures of unannounced products "[finding] their way out of the company more frequently."

– *Matt Hamblen*

Micro Burst

BROWSERS

Google will drop support for Internet Explorer 8 on

Nov. 15

– effectively ending support for Windows XP-based PCs.

SOURCE: GOOGLE

CLOUD COMPUTING

Netflix to Ditch Data Center, Embrace Cloud

Netflix no longer wants to run a data center to support its in-house IT services. Instead, it's shifting internal applications to Amazon's cloud and turning to software-as-a-service providers for other business systems.

Mike Kail, vice president of IT operations at Netflix, said he wants to move at least 95% of the company's corporate IT systems to the cloud.

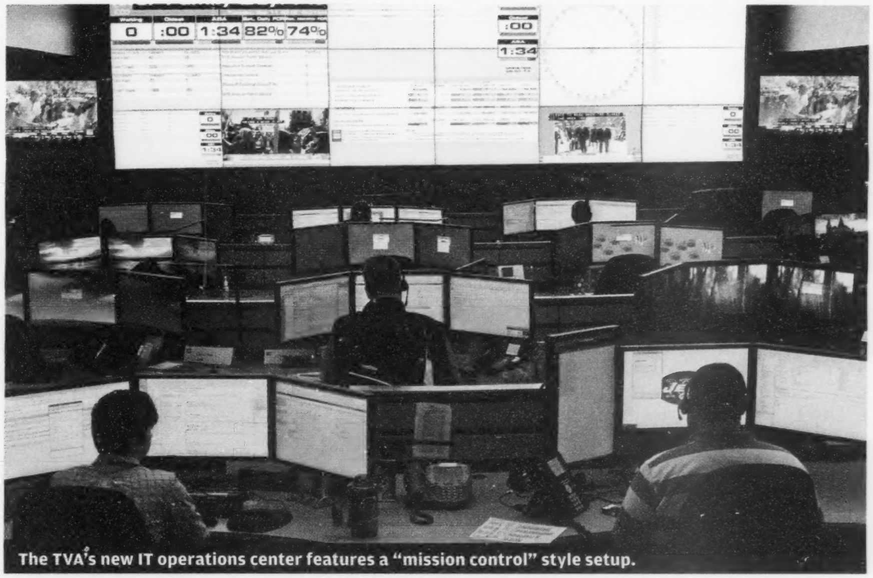
The corporate IT operations are separate from the company's streaming video service, which already runs on Amazon's cloud.

At most, Kail says, he'll have two racks running 50 virtual servers. Such a setup would fit into a closet; it wouldn't require the data center Netflix has now, which runs 2,500 virtual servers. The goal is to finish the move within 18 months.

Kail said that using public cloud services means not paying for power and space, and not having to worry about hardware refreshes or operating system patches. Those are "time-consuming tasks that don't really add value," he said.

This project won't change the skills employees need to manage IT. "Unless you are a person that likes racking gear," Kail said, "you are still managing the same technology and services."

– PATRICK THIBODEAU



The TVA's new IT operations center features a "mission control" style setup.

Help Desk Gets a Makeover at TVA

The Tennessee Valley Authority put its IT operations and its help desk in a state-of-the-art facility serving 12,000 employees. By Patrick Thibodeau

FOR YEARS, the Tennessee Valley Authority help desk was an IT career graveyard — and customers suffered for it. Only about half of user problems were resolved in the first call, well below the industry average.

The TVA's help desk woes led to a lack of IT credibility among the utility's 12,000 employees and an almost equal number of contractors, setting off a self-destructive cycle in which IT was underfunded and business units bypassed IT and contracted for services on their own.

"[IT] was considered irrelevant," said Dan Traynor, CIO at the federal government-owned power provider. "You can't even have a conversation about 'what do we want to invest in' if we can't get their problem solved."

Traynor was hired two and a half years ago to address those credibility issues.

His efforts started to bear fruit this summer, with the opening of the TVA's 12,000-square-foot Information Technology Customer Operations Center, which combines the utility's help desk and network operations. The Chattanooga facility operates 24/7 and is staffed by 80 people who monitor networks, servers and applications — and solve customers' problems.

The facility has a "mission control" layout with a wall of large-screen monitors that keeps everyone abreast of both operations and help desk activity. Meanwhile, each work station can accommodate three to five monitors that employees use to keep track of operations and help desk calls.

With the new facility, the help desk is no longer the job of last resort at the TVA. It has become an entry point into the 580-person IT organization for computer science graduates and is home to some highly experienced IT professionals who do root cause analysis and handle the most difficult calls.

Getting some of the TVA's veterans, including those with rock-star technical reputations, to agree to work in the center was important, Traynor said.

"These are people who have a lot of credibility across the organization," he said. "It helped improve the image of the help desk to have people like that."

The goal of the new operation is to handle any problem in one call, whether by first- or upper-level help desk pros. The first-call resolution rate is now about 80%, and Traynor hopes to get it higher.

Putting network operations and the help desk in the same room, as the TVA did, isn't a common practice — yet, said Roy Atkinson, an analyst at HDI, formerly known as the Help Desk Institute.

But this is an era of experimentation in IT, as organizations look to reduce the time it takes to solve problems and adapt to demands related to the growing use of social media and consumer technologies, Atkinson said.

"There has been a movement to put more technical expertise on the front line so you don't have to wait," he said.

The industry average for first-call resolution is 66%, but typically the "first call" is defined as the first person who answers the call, not calls that are handed off to higher-level personnel, Atkinson noted. Even so, the TVA's 80%, first-call resolution rate is high, he said.

The success of the operation brought credibility to IT, said Traynor, adding that it led to the creation of an advisory council to help prioritize the utility's $200 million annual IT budget. ◆

> "You can't even have a conversation about **'what do we want to invest in'** if we can't get their problem solved."
>
> — **DAN TRAYNOR,** CIO,
> TENNESSEE VALLEY AUTHORITY

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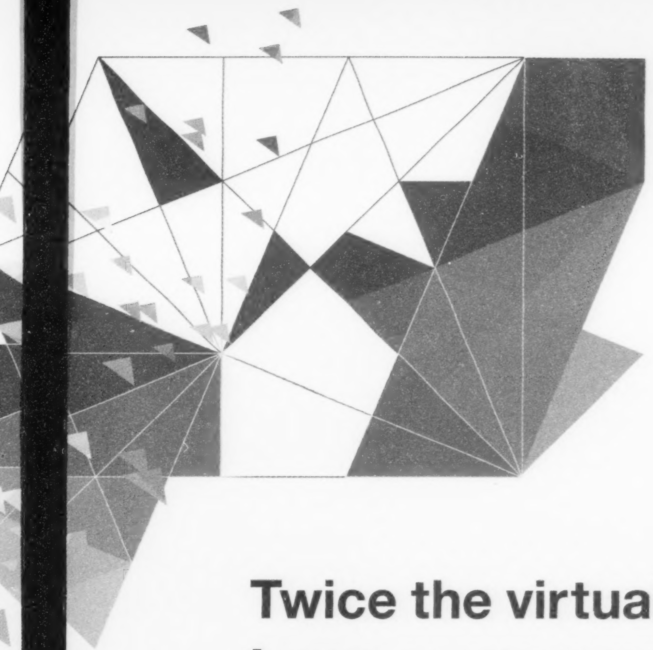

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[1] Based on IBM testing and documented in IBM System x® Virtualization Server Consolidation sizing methodology. IBM Flex System x240 supports 2.7X more Peak Utilization Virtual Machines (VMs) than previous generation BladeCenter® HS22V.

[2] Based on IDC white paper "The Economics of Virtualization: Moving Toward an Application-Based Cost Model," Michelle Bailey, November 2009, http://www.vmware.com/files/pdf/Virtualization-application-based-cost-model-WP-EN.pdf

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The Ohio State Capitol in Columbus.

Ohio Mainframe Exodus Wraps Up In 84,500 Hours

The Ohio Department of Public Safety chose to do all the work in-house when it moved from an aging mainframe to a .Net system.

By Patrick Thibodeau

EARLIER THIS YEAR, the Ohio Department of Public Safety successfully completed a five-year effort to move its mainframe applications to a Windows-based system, and IT personnel did all of the work in-house.

The agency began work on the switchover in 2007 and put the finishing touches on the project in March of this year. The mainframe is now unplugged.

Before embarking on the migration, officials knew the department's Unisys ClearPath Dorado mainframe had to be retired. It was nearing its end-of-life phase, and the MIPS fees that Unisys charged were a burden. Most of the applications on the mainframe were written in Pacbase, an old IBM programming language that became increasingly difficult to support as veteran programmers retired.

Nonetheless, there was much debate about how to migrate applications that had long run the agency's most important operations to a more modern system. Some feared that the task of rewriting mainframe code in Microsoft's .Net language would prove too difficult for the department's engineers and felt that an outside firm should be hired.

Keith Albert, the Ohio Department of Public Safety's chief of IT governance and strategic direction, said that in 2007, the mainframe was running 2,000 programs, about 50 of which no one knew anything about. As IT staffers retired, knowledge about many of the applications was lost.

Officials finally decided to handle the project in-house after hearing estimates that bringing in consultants to handle a transition to Windows could cost as much as $10 million, Albert said.

The planning process proved a bit disconcerting early on, because agency IT officials could find little information about similar migrations that had been successful. "We couldn't find anything out there that said we were going down the right path," Albert recalled.

The department launched the project by spending some $250,000 to provide .Net training to veteran staffers who were more familiar with mainframes and Pacbase, Albert said.

The core of the development team included about 30 in-house staffers and a few contractors who, by Albert's count, spent a total of about 84,500 person-hours on the project.

The team faced significant challenges related to code. In addition to the fact that there were 50 programs that no current staffers knew anything about, there was no inventory for 5% of the code.

Some of the code-related problems were resolved by using a Fujitsu compiler that let Pacbase code execute in Windows. The agency will still need people with Pacbase skills until all of the code is fully rewritten in .Net. "As long as my Pacbase programmers stick around long enough to keep things running, my .Net programmers can rewrite it," Albert said.

To help other IT professionals who are looking to migrate off of mainframes, Albert wrote an 18-page report detailing the steps taken during the migration and the issues faced by the development and management teams. That document is posted on the Ohio Department of Public Safety's website.

Albert did say that the department would have kept the mainframe if Unisys had extended the product's life and cut its MIPS (or millions of instructions per second) fees, which were about $1 million a year.

Unisys, in a written response to a query about the migration, said the agency "made its decision to transition off of its ClearPath system before Unisys introduced the new NextGen platforms and modernization technology." ◆

> “We couldn't find anything out there that said **we were going down the right path.”**
>
> KEITH ALBERT, CHIEF OF IT GOVERNANCE AND STRATEGIC DIRECTION, OHIO DEPARTMENT OF PUBLIC SAFETY

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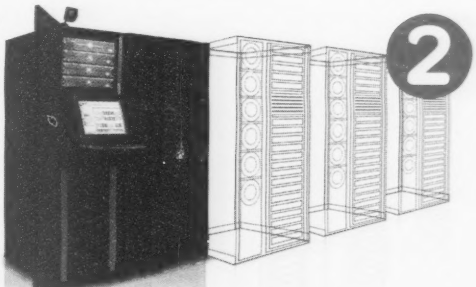

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THE Grill

[illegible]

Rick Schooler

The longtime healthcare CIO explains how analytics is transforming medical care.

Family: Wife, Cindy, three adult sons

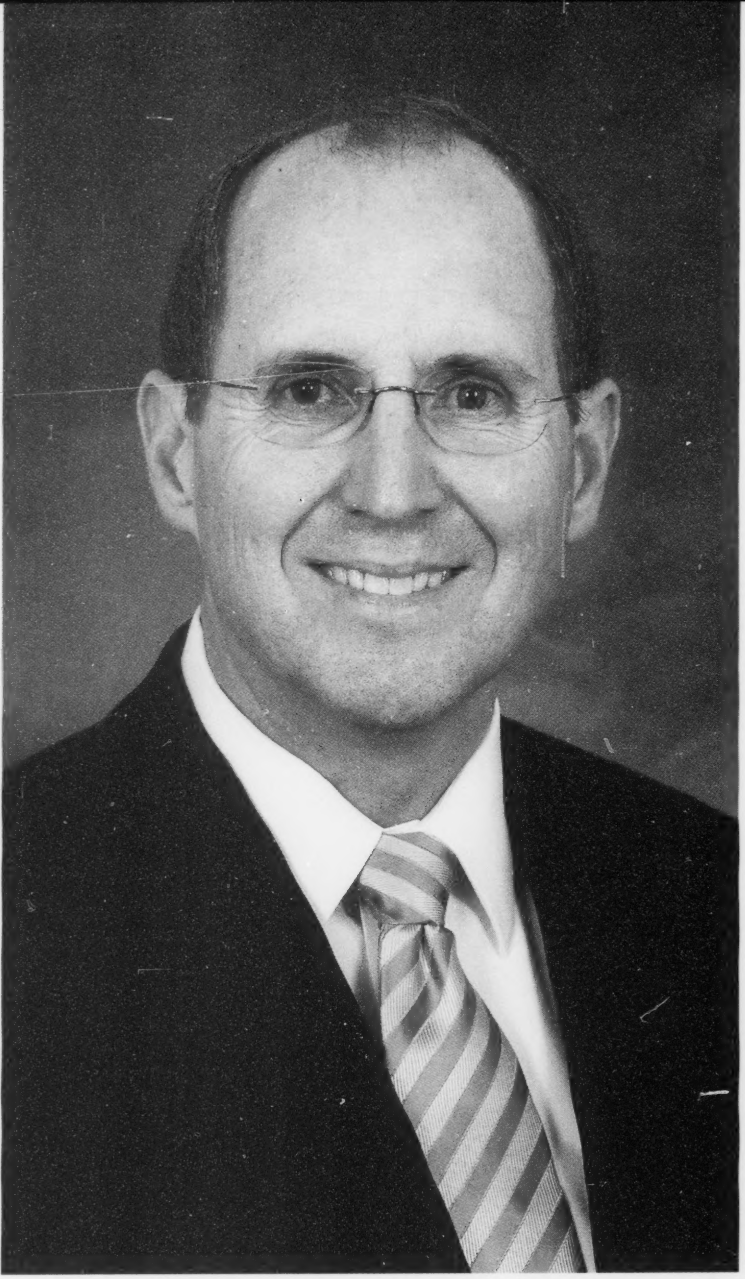
Degrees: MBA from the University of Indianapolis, BS in computer technology from Purdue University

Hobbies: Fishing, boating, cars and all types of music.

What's your favorite way to spend a lazy day? Go to the beach with my wife, and drink really good wine with my sons.

What are you currently reading? *The CIO Edge: Seven Leadership Skills You Need to Drive Results*

What do you do during off-hours? For several years now, I have served the homeless through various organizations. Investing in the lives of people in need is something I believe we all are called to do.



PHOTOGRAPHY COURTESY OF ORLANDO HEALTH

WITH TWO DECADES IN HEALTHCARE IT UNDER HIS BELT, *Rick Schooler, vice president and CIO at Orlando Health, is girding for the next big change, as organizations like his begin harnessing the power of analytics to influence how doctors and nurses treat patients. In recognition of his work in using IT to improve healthcare, Schooler was named the 2011 John E. Gall Jr. CIO of the Year by the College of Healthcare Information Management Executives (CHIME) and the Healthcare Information and Management Systems Society (HIMSS). Here, Schooler reflects on how IT has changed, and will continue to change, medical care.*

You've spent 21 years putting in systems that automate back-office healthcare functions and deploying technologies that give clinicians better access to patient information. What's next for healthcare IT? We've implemented technology to automate healthcare delivery and payment, and we're now in a reality where the focus

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> **We're now in a reality where the focus will go to using information** to better manage care in real time, to use analytics to understand truly what's going on.

will go to using that information to better manage care in real time, to use analytics to understand truly what's going on. We're moving toward a clinically integrated model of care, and the IT platforms that need to be put into place to make that happen are significant and are significantly different than what we put in place in the past.

What is a clinically integrated model of care? The patient's experience in terms of the healthcare continuum becomes seamless, so as a patient transitions through the different levels and venues of healthcare, the information flows through all those venues. In order for this to happen, different players have to come together as a virtual team. We need an information model that really does integrate in ways that in years gone by wasn't possible or wasn't desired.

Where does IT add the most value in healthcare today? You have to look at it on different levels. The first level is foundational — the basic functions: registration, billing, lab systems. That's a level that's just assumed to be there, [but] there are still health systems and providers that do not make use of [those] automation tools. Then you start moving up the value chain, using and exchanging the information that's captured. That's health information exchange, and that allows information to be moved between provider venues. It allows us a more ubiquitous presence of information.

And the layer above that is the ability to mine that data, not only to find out what is causing success or a challenge, but also to learn how to predict and answer the unasked questions: "Let's do some simulation; let's change some variables about care protocols or environmental considerations." So you move out of the realm of capturing data to being able to do true analytics with tools that other industries have been using for a while. That's where the real value comes. That will then enable us to be able to better manage care, to be prompted to do things for our patients that causes them to have better outcomes.

How close are we to achieving that vision? It's already starting. You're going to see a tremendous amount of change to the positive over the next three to five years.

What are the most pressing technological challenges? Information integration between systems is a key challenge. Some of the features and functionality we need to do advanced analytics and information exchange are just now getting to what, in my mind, I call solid. So the IT challenges are still around integration and then being able to take that information and put it in platforms where we can effectively mine it.

Can you elaborate on the idea that the patient's experience is primary in considering your IT strategy? If you look at the patient experience, how easy is it to communicate, to provide or get information, to navigate? These are the logistics. IT can significantly improve that — or make it worse because of poor use or deployment of technology or lack of it. And then there's the clinical experience: How was I treated, and what was my outcome? We definitely have to consider both. For example, we know it doesn't work when the doctor or nurse has to turn her back to enter information when talking to a patient.

So how do you address that problem? We design workflow and user expectations around technology through trial and error. We have to think about the venue of care. We have to think about how we make use of technology that can accommodate different venues. It's a very complex environment, and what comes out of the box doesn't necessarily meet the needs, so it's understanding how we tailor technologies and what other technologies we put around it to make it work for a particular venue.

What is the most impressive advancement that's happened over the course of your career in IT? I'm someone who believes in the cloud. The cloud embodies the principle that people should be able to use technology as a utility. We're going back to a simple computing device that connects you into an enormous amount of information or computing power. I think we're going to see IT departments change radically because of it. You can now go to the Web and get what you need, for a monthly fee. You don't have to design and build it yourself anymore.

– Interview by Computerworld *contributing writer*
Mary K. Pratt *(marykpratt@verizon.net)*

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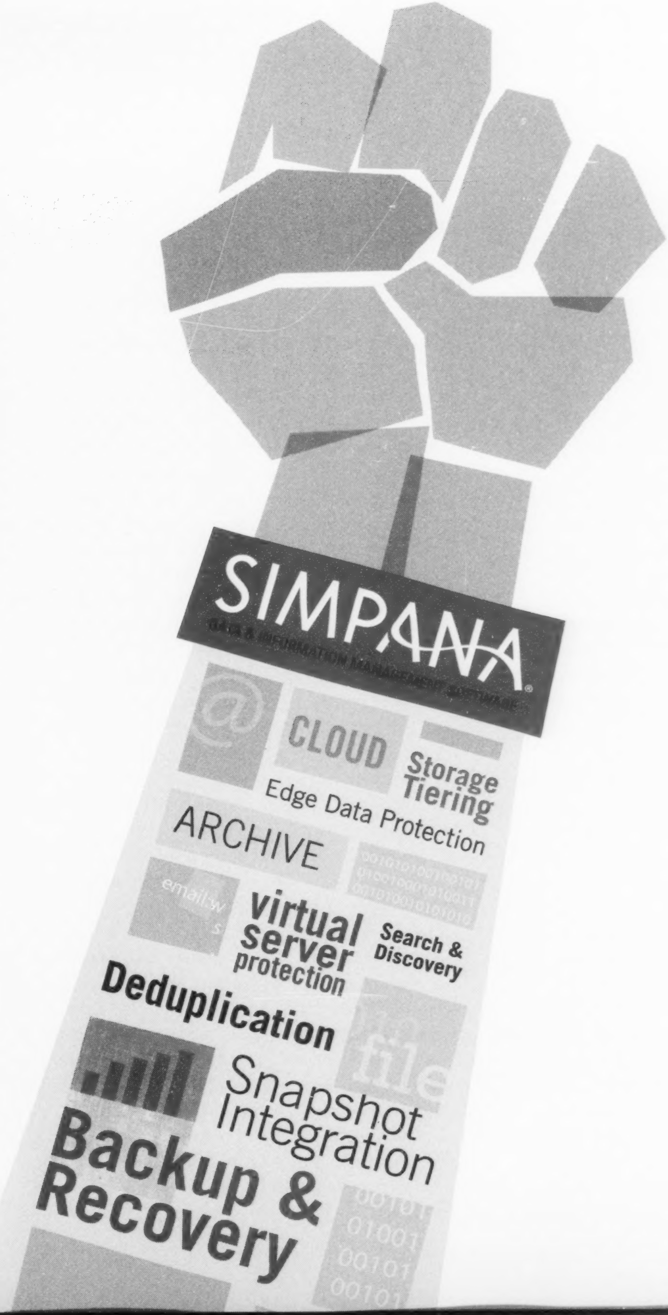
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OPINION

PRESTON GRALLA

Is Microsoft Out to Kill Web Advertising? Let's Get Real

Do Not Track in IE 8 won't kill online advertising. In fact, it will help it.

IF YOU BELIEVE SOME PEOPLE, Windows 8 will sound the death knell of online advertising, helping destroy the fast-growing industry. Their worry is that in Windows 8, Internet Explorer 10 automatically turns on a feature called "Do Not Track," which sends a signal to websites saying that the browser doesn't want its activities tracked. So, the argument goes, advertisers wouldn't be able to serve targeted ads to users. And without targeted advertising, advertisers would be much less interested in spending big money online.

In truth, though, Windows 8 won't kill online advertising. Microsoft, as much as anyone else, has its eyes on that multibillion-dollar prize, and turning on DNT (as insiders call the Do Not Track feature) won't hurt the industry at all. In fact, it will help it.

The idea behind DNT is simple: Give people a way to take control over their privacy when they browse the Web. Ad networks, marketing firms and big sites like Google can gather an enormous amount of information about people if they are able to track their online activities across websites, creating profiles of their likes, dislikes, buying habits and more. DNT would give people some control over that tracking and profiling.

But the online ad industry doesn't like this idea, and it particularly doesn't like Microsoft's decision to make "DNT on" the default setting in IE10. The Digital Advertising Alliance (DAA), a coalition of marketing, advertising and media groups, complained to *The Wall Street Journal* that Microsoft's decision was "unilateral," saying the industry instead supports "consumer choice, not a choice made by one browser or technology vendor." (*Ahem.* Attention, DAA: Consumers retain the choice to turn DNT off.) On the other side of the issue, the EU has applauded Microsoft's action.

Ironically, DNT is nearly worthless as things stand today, because there's no agreement on how it should work. The Worldwide Web Consortium has set up a working group composed of online advertisers, privacy advocates, academics, government agencies and others to figure that out. So far, they've agreed that browsers should let people turn DNT on and off, but there's still no consensus on what turning DNT on would actually mean or whether the default setting should be on or off. But without an agreement on what a DNT signal should mean, advertisers can simply ignore DNT signals. Microsoft Chief Privacy Officer Brendon Lynch said as much in a blog back in May.

So how is Microsoft helping the advertising industry? By turning on DNT by default, it is forcing advertisers to decide what the signal should do. Microsoft, unlike the ad industry, seems to recognize that a business model based on keeping consumers in the dark about privacy won't work.

Rik van der Kooi, head of the advertising business group at Microsoft, recently wrote in *Adweek* that if people are given control over their personal information and are educated about how their Web experience can be enriched by sharing some of it, the ad industry will be better off. He wrote: "By building trust and demonstrating real value — serving ads when they are accretive to the consumer experience and not serving them when they aren't — consumers will be willing to share more information with marketers and online services."

I think he's right. You have to believe that consumers respond more readily to things they're interested in than they do to things they don't care to see. ◆

Preston Gralla is a *Computerworld.com* contributing editor and the author of more than 35 books, including *How the Internet Works* (Que, 2006).

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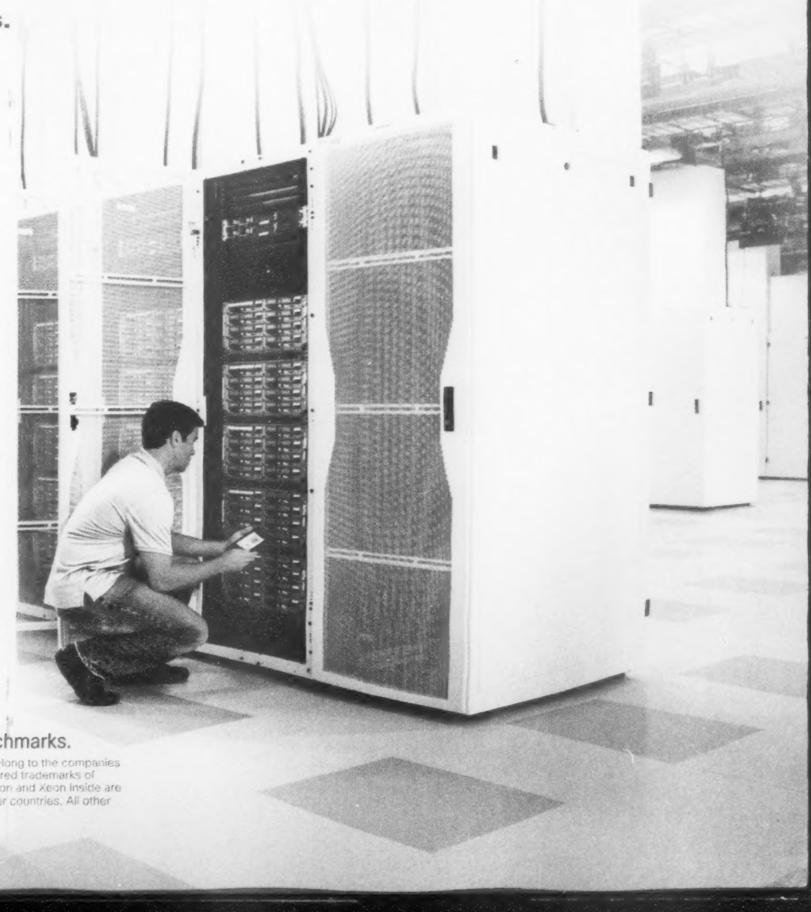

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FORECAST 2013

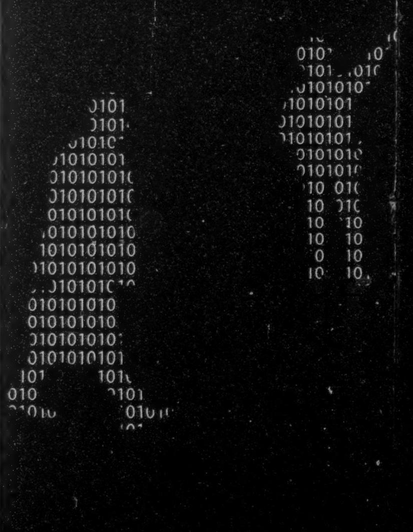
BUILDING A BETTER Budget

Smart IT executives are carefully constructing their budgets for 2013 with both cost-cutting and business growth projects in mind. **BY MARY BRANDEL**

ERIC LINDGREN, CIO at PerkinElmer, will spend the next 12 months like many of his peers: hunting for cost savings that can be reallocated to high-impact technology initiatives, such as mobility and analytics. As part of this effort, his IT group will continue to streamline the company's application portfolio, move last year's acquisitions onto its corporate-standard ERP platform and shift some fixed investments into more variable models via a private cloud.

Lindgren also designed his budget so he can either curtail or expand his investments depending on how the global economy performs. "We're going into the year with contingency plans so that if [the economy] worsens or performs better than we expected, we can react quickly," says Lindgren.

Throughout the U.S., IT organizations are facing similar situations. According to *Computerworld's* Forecast 2013 survey, there is a sense of cautious optimism as IT organizations move into the new budget year. The percentage of respondents who said they're



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seeing an increase in their IT budgets was higher in this year's survey than it was last year: 43%, versus 36% last year. And 64% reported that they plan to make a major IT purchase or upgrade in the next 12 months, up from 60% last year (see charts, below).

More are also taking Lindgren's flexible approach to budgeting: They plan to track economic indicators and adjust their spending levels accordingly, says Andrew Horne, managing director at The Corporate Executive Board. In a recent survey, the business advisory firm found that budgets were expected to rise by just 1.5% to 2%, but Horne believes respondents might expand their spending beyond what they initially report, as they did last year. "People are very cautious as they do their planning, but if they see company or economic performance doing better, they're becoming more agile about being able to invest more," he says. "More people are looking at rolling budget scenarios, to formally embed a degree of flexibility."

Clearly, lessons from the recession are still top of mind: "Containing costs" was cited as the far-and-away No. 1 business priority among the 334 IT executives who participated in *Computerworld*'s Forecast 2013 survey, and "economic pressure" was the top management challenge. And, as in last year's survey, when respondents were asked to name the single most important technology project they would undertake in the coming year, the top two responses were virtualization and the cloud, both of which promise to reduce operating costs.

"All of us are facing the same challenge," says Joe Mahaffee, executive vice president and chief information security officer at Booz Allen Hamilton. "We've all got infrastructure we need to manage, increasing cost pressures and uncertainty in the market, but we're all focused on our growth agendas, whatever they may be. We've got to leverage technology in a more effective and efficient manner to allow that to happen."

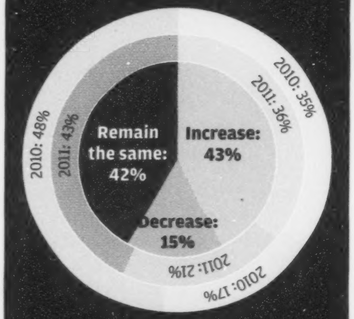
Strategic Investments

Booz Allen has increased its technology expenditures in the past two or three years, but its budget will be flat in the next 12 months, Mahaffee says. However, a look at the consulting firm's 2013 priorities reveals seven strategic initiatives that serve the dual purpose of growing the business while managing costs — or, as Mahaffee puts it, "getting more for less."

The initiatives include migrating to the cloud, expanding mobility capabilities, consolidating assets and applications, optimizing IT services, rolling out a unified communications framework, improving security and continuing virtualization efforts.

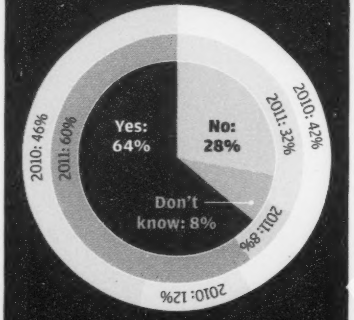
BUDGETS BOUNCE

What changes, if any, do you expect in your organization's IT budget in the next 12 months?



SHOPPING LIST

Is your organization planning any major upgrades or purchases in the next 12 months?



SOURCE: *COMPUTERWORLD'S* 2013 FORECAST SURVEY OF 334 IT EXECUTIVES, JUNE 2012

On the cost-savings side, Mahaffee says Booz Allen is formalizing its bring-your-own-device (BYOD) initiative by implementing a mobile data management system to centralize oversight of employees' mobile devices — a move designed to improve productivity, reduce risk and lower costs. The firm is still deciding what data to move to the cloud, but Mahaffee says any savings will be reinvested into technologies that support high-growth initiatives. "That's our over-arching philosophy," he says.

In *Computerworld*'s survey, half of the respondents said they planned to invest in cloud computing, and more than one-third said that was one of the most important technology investments they planned to make. And according to Gartner, there will be growing demand for public cloud services: The research firm expects that market to grow by 19%, to $109 billion this year and then soar to $207 billion by 2016.

On the growth side, Booz Allen will extend mobile capabilities to its cybersecurity professionals and clients so they can remotely access forensics, analytics, intelligence, network monitoring and training tools via the firm's newly launched Cyber Solutions Network, which connects Booz Allen's many cyber labs, centers and stations. The analytics tools will help clients mine their data to discover insights and make predictions around fraud, cybercrime and other adversarial events.

In the past, if a Booz Allen consultant wasn't sitting in close proximity to one of the firm's centers, he would have had difficulty gaining full access to those tools and resources, Mahaffee says. Additionally, clients can quickly ramp up their access to the consultancy's expertise and resources on an as-needed basis when security issues arise. "That's the way a lot of clients are buying these days," he says. "They can't afford a standing workforce waiting for something to happen."

All Eyes on Mobility

Booz Allen has lots of company when it comes to mobility: Half of the respondents to *Computerworld*'s survey said they planned to purchase laptops or netbooks in the next 12 months, and 43% said they planned to invest in mobile devices. In the Corporate Executive Board survey, a majority of respondents said they were already investing in mobile, and more than one-third said they planned to increase their spending on mobile technology. "The absolute amount of spending is still relatively low, but it will increase as companies see new opportunities on the customer or supply side for using mobility to

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improve productivity or engage with customers," Horne says.

Western & Southern Financial Group is one of those companies. In the past several months, it has reorganized its IT unit to devote more resources to emerging technologies — mobility and social media in particular. "A financial services professional presenting with a tablet that he can hand to you is more impressive than setting up a laptop and waiting 30 seconds for it to start up," says Doug Ross, vice president and CTO at Western & Southern. The company has a cross-functional team that dedicates chunks of time each week to research emerging technologies, he says. "We're trying to take an agile approach that dictates involvement from business people to deliver the best experience," he says.

PerkinElmer also has a mobility initiative. Later this year, says Lindgren, the company will outfit its sales and service reps with third-party mobile customer analytics applications that will run on company-issued Android devices and employee-owned iPhones. "When they're going to visit a customer, they can pull up revenue and other information on the customer, like what products they've been purchasing and how their business has been changing," he says.

On the cost-cutting side, PerkinElmer is looking toward analytics tools that will give managers better visibility into global spending. In the past year, Lindgren says, the company rolled out a system that enabled managers to study expenditures and cut costs by reducing the number of vendors they use. "They get a better idea of spending patterns, down to the invoice level," Lindgren says. The company also wants to consolidate the private cloud environments of four software companies it acquired last year, moving them all into one center.

Lindgren's goal is to spend less each year on pure maintenance and "keep-the-lights-on" activities and free up dollars to invest in growth areas. Some of this is happening naturally, he says, as commodity prices go down and the company's need to spend on ERP declines as it moves to a standardized platform. "As we achieve cost savings, we can invest in new technologies and offset the budget increases," Lindgren says.

VIRTUAL WINS

Which technologies does your organization expect to purchase in the next year?

Virtualization technologies	**82%**
Servers	**56%**
Laptops/netbooks	**52%**
Cloud computing	**50%**
Desktops	**45%**
Mobile devices	**43%**

SOURCE: *COMPUTERWORLD'S* 2013 FORECAST SURVEY OF 334 IT EXECUTIVES, JUNE 2012

Changes to the Business Case

According to Horne, this is the direction in which IT spending is moving: away from core infrastructure, such as ERP and customer relationship management (CRM) systems, and toward information-driven projects, including customer-facing systems (social media, marketing and Web applications), business intelligence (BI) and analytics, and collaboration. "Even if total spending is fixed, over time, we're seeing it move from enabling processes to enabling knowledge workers," Horne says.

Forrester Research analyst Craig Symons also sees spending heading in that direction; he cites mobile apps, mobile middleware, BI and customer analytics as major investment categories.

Keeping a Grip

THANKS TO TRENDS like cloud computing, the consumerization of IT and the bring-your-own-device (BYOD) movement, a company's IT budget and its technology expenditures aren't always one and the same. In many cases, technology decisions and purchases – particularly those involving mobile apps and the cloud – are made by individuals or business units, not by IT.

"If you look at an enterprise's total [technology expenditure], what percent does the IT budget represent today?" asks Forrester Research analyst Craig Symons. "I would submit that many organizations would not be able to answer that, because they have no idea what the business is spending on technology outside of IT."

In *Computerworld*'s Forecast survey, almost half of the respondents said that 10% or less of total technology spending occurred outside of the IT budget. But Andrew Horne, managing director at The Corporate Executive Board, agrees that non-IT technology spending is a burgeoning – and not yet quantified – trend. "In the past, it would lead to shadow IT organizations, which were wasteful and insecure," he says. "But today, it's buying services from the cloud," which doesn't require the hiring of additional IT personnel.

Horne says the trend can be a healthy one, as long as the technology purchase is contained within one business area and doesn't cut across other processes or produce data that other functions could benefit from. Otherwise, he says, IT would need to get involved and integrate the new system.

What often happens, says Symons, is that the sales organization, for example, purchases a Salesforce.com tool and thousands of tablets and IT doesn't hear about it for months – and then only when the sales team discovers that the application would be more useful if it were tied to a corporate database.

This trend is also increasing the need for security controls. In a recent Forrester survey, respondents named risk management as their top IT priority for the coming year. IT professionals are concerned that corporate data is put at risk when employees, for example, use a cloud offering like Dropbox to get around the email system's limitations on attachment size. And with BYOD initiatives, Symons says that reductions in enterprise spending on mobile devices are offset by the need to invest in remote management systems and adopt corporate security policies. "All of a sudden, corporate data is sitting on a folder in the cloud," he says. "It creates all sorts of issues."

– MARY BRANDEL

Information-driven initiatives usually cost less than their infrastructure-based counterparts, require less up-front commitment and can be completed more quickly, says Horne. With these types of projects in their portfolios, companies can be more agile about their spending plans — but payback is more difficult to measure, he notes.

“Traditionally, it’s ‘How much more cheaply can we do this process?’ or ‘Can we reduce head count?’ ” he says. “But if you’re giving someone better analytical tools or enabling them to collaborate better or work better on the road, the benefits are clear, but they’re harder to measure.” The business case is often wrapped around making the workforce more productive and able to produce more value through better decisions and more collaboration, he says.

Squeeze and Spend

At Western & Southern, however, Ross is finding the current economic climate to be an easier one in which to make the business case for two multiyear projects that are more process-oriented than information-oriented: an enterprise content management system and a unified communications system, both of which will replace existing systems that have reached end-of-life status. “There’s a little bit more openness to embark on these larger projects,” Ross says. “I think they could have been justified even in the darkest days of 2008 and 2009, but we would have gone through more hoops.”

While the unified communications system will reduce costs over time, it will require a significant change management effort, Ross says. The content management system will result in significant cost savings and improve cycle time, because it will streamline core business processes, impacting about 80% of the company, he says. It will also improve the customer experience as transactions and information move online. “Our initial look says it could be quite transformative and beneficial to the entire company,” Ross says.

Financially, these endeavors have been made possible by a 2% increase in the IT budget for 2013, and by a significant reduction in capital expenditures over the past few years, thanks to virtualization, a reduced data center footprint, decreases in hardware prices and heavy use of software-as-a-service (SaaS) applications. Ironically, Ross says, operational spending on SaaS offerings has risen so dramatically of late that in the coming year he will focus on reducing costs by streamlining Western & Southern’s SaaS portfolio, which consists of more than 100 applications.

Some of these applications are only available in SaaS form, but Ross says there are opportunities to, for example, whittle down the 12 to 15 CRM applications in use. Even though these systems are tightly aligned to specialized financial services that the company offers, he says, “if we did a careful analysis of the features and functions, we’d see a heavy overlap. Maybe we can get away with just a couple or a centralized CRM system that is tailored for each business unit.”

Time for Rationalization

Portfolio rationalization is an activity that many CIOs will undertake next year, says Alan Guibord, founder of The Advisory Council. “Economic cycles are getting shorter, and decision cycles are getting shorter,” he says. “Most clients are saying, ‘How do we simplify things and create an infrastructure that can be more reactive to the needs of users? What can we condense, consolidate and throw away? What do we outsource, and what do we keep in-house?’ ”

In many cases, he says, companies are moving to a more variable cost structure, in which they bring in specific expertise when they need it and get rid of it when they don’t. “No one is opening up their pockets to spend more money — they have the pocket of money and need to adjust spending to a more realistic model,” says Guibord.

This means taking a holistic view — understanding the business strategy, identifying the initiatives that are tied to that strategy and determining which pieces of the IT portfolio support those initiatives. Once you identify the core competencies needed to fulfill those initiatives, you can align your resources accordingly and find more variable ways to fulfill your other areas of needed expertise, he says.

In the end, whether you think 2013 will be the year of the cloud, the year of mobility, the year of analytics or the year of security, this much is clear: IT shops can’t jump on any technology bandwagon that comes along without reviewing its ability to foster growth, and they have to continually look for ways to cut costs.

“We can’t afford, even in tough times, not to invest in technology that supports the business — that’s who we are,” Mahaffee says. “So we need to make smart choices that allow us to invest where the growth opportunities are and make sure the infrastructure is tuned to enable them.” ◆

Brandel *is a* Computerworld *contributing writer. You can contact her at marybrandel@verizon.net.*

BUDGET-MINDED

Which of these are business priorities for your company in the next 12 months?

Containing costs	59%
Growing revenue	41%
Optimizing existing investments	36%
Accelerating business process and agility	35%
Growing market share	34%
Enhancing competitiveness	33%
Getting better connected with customers	31%
Improving collaboration with business	22%
Attracting new talent	18%

MONEY MATTERS

What do you expect will be your single biggest management challenge in the next 12 months?

Budget constraints/ economic pressures	24%
Managing projects	20%
Security	11%
Managing personnel	10%
Managing expectations/ business alignment	10%
Regulatory compliance	7%
Developing a mobile management strategy	6%
New application development	5%

SOURCE: *COMPUTERWORLD*’S 2013 FORECAST SURVEY OF 334 IT EXECUTIVES, JUNE 2012 improve productivity or engage with customers," Horne says.

Western & Southern Financial Group is one of those companies. In the past several months, it has reorganized its IT unit to devote more resources to emerging technologies — mobility and social media in particular. "A financial services professional presenting with a tablet that he can hand to you is more impressive than setting up a laptop and waiting 30 seconds for it to start up," says Doug Ross, vice president and CTO at Western & Southern. The company has a cross-functional team that dedicates chunks of time each week to research emerging technologies, he says. "We're trying to take an agile approach that dictates involvement from business people to deliver the best experience," he says.

PerkinElmer also has a mobility initiative. Later this year, says Lindgren, the company will outfit its sales and service reps with third-party mobile customer analytics applications that will run on company-issued Android devices and employee-owned iPhones. "When they're going to visit a customer, they can pull up revenue and other information on the customer, like what products they've been purchasing and how their business has been changing," he says.

On the cost-cutting side, PerkinElmer is looking toward analytics tools that will give managers better visibility into global spending. In the past year, Lindgren says, the company rolled out a system that enabled managers to study expenditures and cut costs by reducing the number of vendors they use. "They get a better idea of spending patterns, down to the invoice level," Lindgren says. The company also wants to consolidate the private cloud environments of four software companies it acquired last year, moving them all into one center.

Lindgren's goal is to spend less each year on pure maintenance and "keep-the-lights-on" activities and free up dollars to invest in growth areas. Some of this is happening naturally, he says, as commodity prices go down and the company's need to spend on ERP declines as it moves to a standardized platform. "As we achieve cost savings, we can invest in new technologies and offset the budget increases," Lindgren says.

Changes to the Business Case

According to Horne, this is the direction in which IT spending is moving: away from core infrastructure, such as ERP and customer relationship management (CRM) systems, and toward information-driven projects, including customer-facing systems (social media, marketing and Web applications), business intelligence (BI) and analytics, and collaboration. "Even if total spending is fixed, over time, we're seeing it move from enabling processes to enabling knowledge workers," Horne says.

Forrester Research analyst Craig Symons also sees spending heading in that direction; he cites mobile apps, mobile middleware, BI and customer analytics as major investment categories.

VIRTUAL WINS

Which technologies does your organization expect to purchase in the next year?

Virtualization technologies	**82%**
Servers	**56%**
Laptops/netbooks	**52%**
Cloud computing	**50%**
Desktops	**45%**
Mobile devices	**43%**

SOURCE: *COMPUTERWORLD'S* 2013 FORECAST SURVEY OF 334 IT EXECUTIVES, JUNE 2012

Keeping a Grip

THANKS TO TRENDS like cloud computing, the consumerization of IT and the bring-your-own-device (BYOD) movement, a company's IT budget and its technology expenditures aren't always one and the same. In many cases, technology decisions and purchases – particularly those involving mobile apps and the cloud – are made by individuals or business units, not by IT.

"If you look at an enterprise's total [technology expenditure], what percent does the IT budget represent today?" asks Forrester Research analyst Craig Symons. "I would submit that many organizations would not be able to answer that, because they have no idea what the business is spending on technology outside of IT."

In *Computerworld*'s Forecast survey, almost half of the respondents said that 10% or less of total technology spending occurred outside of the IT budget. But Andrew Horne, managing director at The Corporate Executive Board, agrees that non-IT technology spending is a burgeoning – and not yet quantified – trend. "In the past, it would lead to shadow IT organizations, which were wasteful and insecure," he says. "But today, it's buying services from the cloud," which doesn't require the hiring of additional IT personnel.

Horne says the trend can be a healthy one, as long as the technology purchase is contained within one business area and doesn't cut across other processes or produce data that other functions could benefit from. Otherwise, he says, IT would need to get involved and integrate the new system.

What often happens, says Symons, is that the sales organization, for example, purchases a Salesforce.com tool and thousands of tablets and IT doesn't hear about it for months – and then only when the sales team discovers that the application would be more useful if it were tied to a corporate database.

This trend is also increasing the need for security controls. In a recent Forrester survey, respondents named risk management as their top IT priority for the coming year. IT professionals are concerned that corporate data is put at risk when employees, for example, use a cloud offering like Dropbox to get around the email system's limitations on attachment size. And with BYOD initiatives, Symons says that reductions in enterprise spending on mobile devices are offset by the need to invest in remote management systems and adopt corporate security policies. "All of a sudden, corporate data is sitting on a folder in the cloud," he says. "It creates all sorts of issues."

– MARY BRANDEL

Information-driven initiatives usually cost less than their infrastructure-based counterparts, require less up-front commitment and can be completed more quickly, says Horne. With these types of projects in their portfolios, companies can be more agile about their spending plans — but payback is more difficult to measure, he notes.

"Traditionally, it's 'How much more cheaply can we do this process?' or 'Can we reduce head count?' " he says. "But if you're giving someone better analytical tools or enabling them to collaborate better or work better on the road, the benefits are clear, but they're harder to measure." The business case is often wrapped around making the workforce more productive and able to produce more value through better decisions and more collaboration, he says.

Squeeze and Spend

At Western & Southern, however, Ross is finding the current economic climate to be an easier one in which to make the business case for two multiyear projects that are more process-oriented than information-oriented: an enterprise content management system and a unified communications system, both of which will replace existing systems that have reached end-of-life status. "There's a little bit more openness to embark on these larger projects," Ross says. "I think they could have been justified even in the darkest days of 2008 and 2009, but we would have gone through more hoops."

While the unified communications system will reduce costs over time, it will require a significant change management effort, Ross says. The content management system will result in significant cost savings and improve cycle time, because it will streamline core business processes, impacting about 80% of the company, he says. It will also improve the customer experience as transactions and information move online. "Our initial look says it could be quite transformative and beneficial to the entire company," Ross says.

Financially, these endeavors have been made possible by a 2% increase in the IT budget for 2013, and by a significant reduction in capital expenditures over the past few years, thanks to virtualization, a reduced data center footprint, decreases in hardware prices and heavy use of software-as-a-service (SaaS) applications. Ironically, Ross says, operational spending on SaaS offerings has risen so dramatically of late that in the coming year he will focus on reducing costs by streamlining Western & Southern's SaaS portfolio, which consists of more than 100 applications.

Some of these applications are only available in SaaS form, but Ross says there are opportunities to, for example, whittle down the 12 to 15 CRM applications in use. Even though these systems are tightly aligned to specialized financial services that the company offers, he says, "if we did a careful analysis of the features and functions, we'd see a heavy overlap. Maybe we can get away with just a couple or a centralized CRM system that is tailored for each business unit."

Time for Rationalization

Portfolio rationalization is an activity that many CIOs will undertake next year, says Alan Guibord, founder of The Advisory Council. "Economic cycles are getting shorter, and decision cycles are getting shorter," he says. "Most clients are saying, 'How do we simplify things and create an infrastructure that can be more reactive to the needs of users? What can we condense, consolidate and throw away? What do we outsource, and what do we keep in-house?' "

In many cases, he says, companies are moving to a more variable cost structure, in which they bring in specific expertise when they need it and get rid of it when they don't. "No one is opening up their pockets to spend more money — they have the pocket of money and need to adjust spending to a more realistic model," says Guibord.

This means taking a holistic view — understanding the business strategy, identifying the initiatives that are tied to that strategy and determining which pieces of the IT portfolio support those initiatives. Once you identify the core competencies needed to fulfill those initiatives, you can align your resources accordingly and find more variable ways to fulfill your other areas of needed expertise, he says.

In the end, whether you think 2013 will be the year of the cloud, the year of mobility, the year of analytics or the year of security, this much is clear: IT shops can't jump on any technology bandwagon that comes along without reviewing its ability to foster growth, and they have to continually look for ways to cut costs.

"We can't afford, even in tough times, not to invest in technology that supports the business — that's who we are," Mahaffee says. "So we need to make smart choices that allow us to invest where the growth opportunities are and make sure the infrastructure is tuned to enable them." ◆

Brandel *is a* Computerworld *contributing writer. You can contact her at marybrandel@verizon.net.*

BUDGET-MINDED

Which of these are business priorities for your company in the next 12 months?

Containing costs	**59%**
Growing revenue	**41%**
Optimizing existing investments	**36%**
Accelerating business process and agility	**35%**
Growing market share	**34%**
Enhancing competitiveness	**33%**
Getting better connected with customers	**31%**
Improving collaboration with business	**22%**
Attracting new talent	**18%**

MONEY MATTERS

What do you expect will be your single biggest management challenge in the next 12 months?

Budget constraints/ economic pressures	**24%**
Managing projects	**20%**
Security	**11%**
Managing personnel	**10%**
Managing expectations/ business alignment	**10%**
Regulatory compliance	**7%**
Developing a mobile management strategy	**6%**
New application development	**5%**

SOURCE: *COMPUTERWORLD'S* 2013 FORECAST SURVEY OF 334 IT EXECUTIVES, JUNE 2012

Out FOR A SPIN

These forward-thinking IT shops are testing out new ways to use the latest technologies to drive revenue, enhance customer service and more.

BY STACY COLLETT

[redacted]

RESTAURANT TABS paid by phone without showing a credit card. Advice on personnel issues available to managers on mobile phones. College students' lab work done at home through virtualized software. These are just some of the hot projects that IT shops are working on.

With beefier IT budgets comes more money to try out new technologies. In fact, the percentage of respondents to *Computerworld's* annual Forecast survey who report that they're beta-testing or conducting pilot programs has been rising steadily for the past few years. More than three quarters (77%) of the 334 IT executives surveyed by *Computerworld* in June said their teams are beta-testing or piloting new technologies to be unveiled next year. That's up from 43% four years ago.

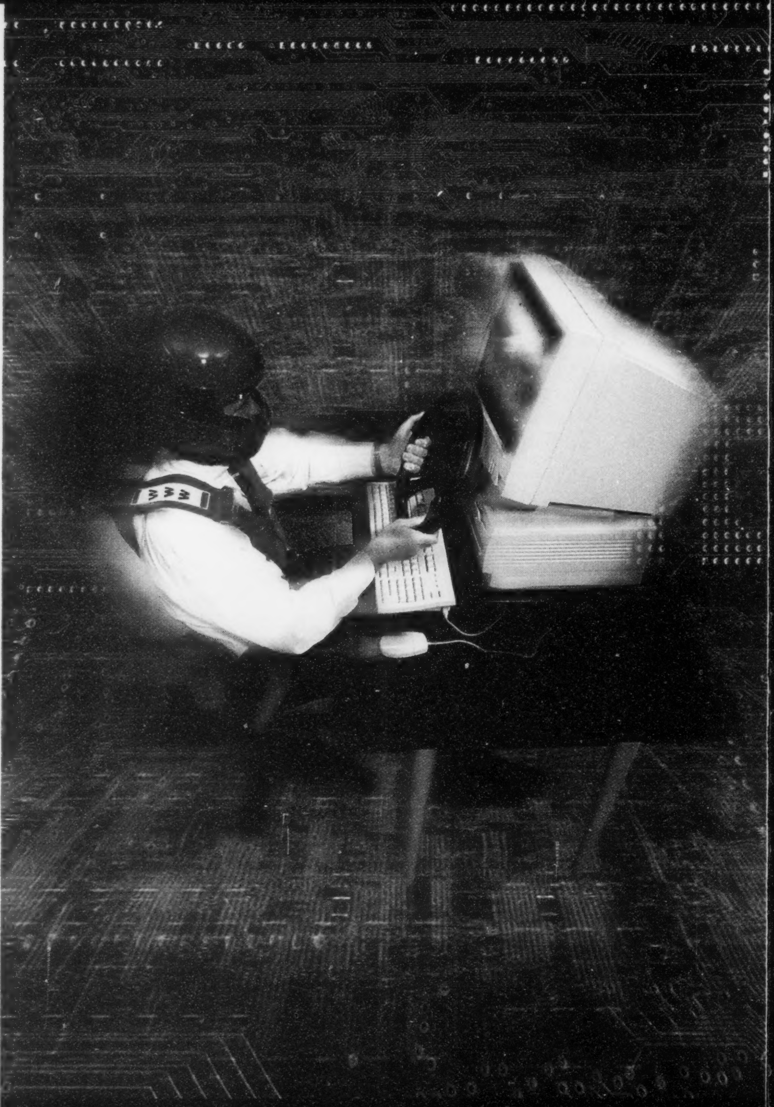
This year, the top piloted projects involve virtualization, mobile and wireless, cloud and security technologies. Here's a look inside four IT shops that are trying something new with each of those technologies.

Students Get Better Service With Virtualization

For 74% of Forecast survey respondents who said they're involved in beta tests or pilot programs, virtualization tops the list of technologies being studied, and the initiatives include server, storage, network and mobile virtualization.

"Our jump into the virtualized world has been with both feet, and we've done it fairly quickly because we don't have enough time in the day to do everything we need to do and this was a simple and logical move for us," says Stephen Vieira, CIO and executive director of The Community College of Rhode Island in Warwick.

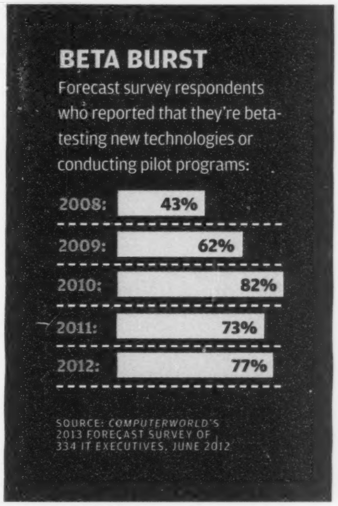
Vieira's IT team has been working with VMware's View and Liquidware Labs' ProfileUnity to bring virtualized applications to 18,000 students on four campuses.



ADAM CROWLEY / GETTY IMAGES

Many students must complete lab assignments on specialized software that was available only in laboratory facilities. But the labs were only open from 8 a.m. to 10 p.m., while surveys showed that students, many of whom work one or two jobs in addition to taking classes, tackled homework between 11 p.m. and 3 a.m. "With virtualized applications, students will be able to use the software 24/7," Vieira says.

The applications, to be rolled out this fall, also let the college keep licensing costs low by giving students access to software only for the classes they're registered for. "We can control the licensing and how many people use it in a period of time," says Vieira. Students can also save their personal settings between log-ins.


BETA BURST

Forecast survey respondents who reported that they're beta-testing new technologies or conducting pilot programs:

SOURCE: *COMPUTERWORLD'S* 2013 FORECAST SURVEY OF 334 IT EXECUTIVES, JUNE 2012

The lab applications are the latest addition to the school's year-and-a-half-long move toward a completely virtualized environment. "We are expanding our virtualization platform into virtual desktops, virtual networks and virtual storage solutions," says Vieira. With just 40 IT employees serving four campuses, he says, "our staffing is such that we need to be more efficient and selfish with our time; these new technologies provide the stability, redundancy and resilience we need."

Doctors Get Study Help With Mobile Apps

New mobile and wireless technologies are getting a workout at 62% of the companies in the *Computerworld* Forecast 2013 survey that are engaged in testing, including 34% that are testing or piloting tablets.

The American College of Physicians (ACP), a professional society for internists, has been testing a mobile version of its medical knowledge self-assessment program, a study guide with a series of questions that help physicians prepare for board exams. Traditionally, the material was available only in printed documents and on CD-ROMs. But in recent years, many old-school physicians have become as tech-savvy as recent med school grads when it comes to mobile technology, prompting the ACP to expand its media options.

For the upcoming edition, the CD-ROMs will be retired in favor of a collection of mobile apps for the iPhone, the iPad and Android devices that will be bundled with the online version of the test preparation materials. When the online materials and mobile apps are synced, users can chip away at the 1,200 multiple-choice questions from wherever they are.

"This is the way to meet everybody's needs so we don't force people to choose between a mobile app, mobile Web or a full version," says Steven Spadt, the ACP's vice president of digital products and services. "The challenge for us is creating synchronization between all of those, so they can use their iPhone app on the train, full browser in the office and iPad at home." The medical society has developed the apps in-house and will launch them in January 2013.

On the publishing front, the ACP is piloting PressRun from Mobile IQ, a cloud-based digital publishing platform for tablets, to increase speed to market and publishing efficiency for its medical publications. (Mobile IQ was acquired by Quark Software in May.)

"Having a publishing platform connected to apps is something we're going to do more and more," Spadt says. The society is also developing a custom iPad application for its *Annals of Internal Medicine* journal. "We wanted it to be differentiated from other medical journal apps, which really are just print on your screen," he notes.

The Ken Blanchard Cos. is also beta-testing a mobile technology. In June the Escondido, Calif.-based leadership training firm began testing a mobile app designed to help managers diagnose issues with their direct reports and then suggest action they can take to help them resolve the problems.

Built for iOS, Android and HTML5, the training app has been deployed at a large global telecommunications company in Europe. Users can download the app for free, but activation requires a special code provided by Blanchard.

"This is really a step forward in our move toward a lot more electronic delivery of training materials," says Terry Orletsky, vice president of IT at Blanchard.

Classroom Materials Arrive Reliably With Cloud

Cloud computing projects are under way at 46% of the survey respondents involved in testing, and Blanchard is among the companies with teams working on public, private and hybrid clouds. The training firm is putting the finishing touches on a five-year project to build a cloud-based delivery platform for all of its training materials and documentation. To be released this year, the platform, known as the Blanchard Exchange, will handle the distribution and activation of apps for training materials via the Amazon S3 cloud storage service.

"We've pretty much had logarithmic growth in digital materials in the past five years," says Orletsky. "We've gone from 4% to 5% of our materials distributed electronically to now 75%. We're getting out of the high costs of manufacturing, shipping and logistics" associated with printed materials.

Amazon has the edge over competitors in terms of server locations, says Orletsky. "We are a global organization with our business in Asia, Europe and Africa. Having this stuff nearby geographically cuts down on the potential long download times," he says.

The Blanchard Exchange has helped cut costs and streamline operations in other areas as well. Five years ago, as the company expanded globally, it encountered problems getting shipments of workbooks through customs in some countries. "We weren't in a position to pay off people in order to get them through," says Orletsky, adding that in one case, the company was unable to deliver a shipment to India, leaving "classes of students high and dry."

TESTING OUT TECH

In which technology areas are you now beta-testing or conducting pilot programs?

1. **Virtualization: 74%** *(includes server, storage, network and mobile)*
2. **Mobile/wireless devices: 62%** *(includes 34% who are beta-testing tablets)*
3. **Cloud computing: 46%**
4. **Security: 26%**

SOURCE: *COMPUTERWORLD'S* 2013 FORECAST SURVEY, JUNE 2012.

BASE: 258 IT EXECUTIVES WHO SAID THEIR COMPANIES ARE BETA-TESTING OR CONDUCTING PILOT PROGRAMS.

The cloud-based exchange helps the company avoid such roadblocks. "There are no borders to digital transition of materials," says Orletsky.

The exchange is also more secure than earlier delivery methods. In the old days, the company used special bindings, plastic tabs and special colors to thwart pirating of its printed intellectual property. Now its materials are protected electronically.

The Blanchard Exchange will include homegrown digital rights management tools to keep track of what customers download and where they do it. "A lot of digital rights management platforms are so restrictive in terms of how people consume our stuff," Orletsky says. "We thought we could do it ourselves by having something useful and easy to use in an FTP platform and have people pick what they want and the number of copies they print."

Blanchard has also found another silver lining to the cloud: a disaster recovery solution. "Every company needs reliable off-premises storage," says Orletsky. "The cloud is where this stuff belongs. It's cheaper and more convenient than anything else."

He says the Blanchard Exchange will be fully operational in late 2013. The first phase, completed this summer, included storage and managed distribution of all electronic documentation in Amazon S3. Phase 2 will provide client delivery and some customer self-service. The final test phase will focus on modularization, which will allow customers to select their own courseware from a lineup of 300 products.

Customers Pay Safely With Secure Mobile App and Device

More than a quarter (26%) of the *Computerworld* 2013 Forecast survey respondents who are engaged in testing said they're developing security technologies. For example, Esco, an IT company serving the loan settlement industry, and its Portsmouth, Va.-based subsidiary MyCaPa have developed a secure Android app that's designed to eliminate the need to show a credit card when making a payment in a restaurant or store.

"Our goal here is to eliminate fraud," says Esco CIO Paul Robert. "The main source of fraud with credit cards is that the merchant has enough information from your credit card that if it gets into the wrong hands, then fraud happens. So let's eliminate that information from the credit card cycle."

A small device the size of a cigarette lighter connects to the merchant's printer and PC and to secure Linux transaction servers. Customers use a four-digit code printed on their receipt to authenticate and verify payment on an Android phone. Patrons can also use the app to add a tip — all without revealing their names or credit card numbers to the business, Robert says.

"Only four pieces [go out from] the phone application to the server: the vendor number, invoice number, amount paid and tip," he says. The phone app authenticates the payer through a series of questions and codes.

The devices and app are being tested in "a couple of stores and restaurants today," Robert says, and will roll out in mid- to late 2013.

Esco is also looking to eliminate denial-of-service attacks during loan settlement transactions where hundreds of thousands of dollars are at risk. The company has taken a Linux kernel and reduced the instruction set in the kernel so that laptops used by title company reps in settlement transactions can communicate only with a few known IP addresses.

"TCP/IP only has about 37 commands inherent to it. We decided that only six of those commands are necessary," Robert explains. "If you send the TCP/IP to our server, where these IP addresses are, and it isn't formatted the way we expected and if it's not one of the six commands, or if it doesn't have the encryption we want, we discard the packet."

The technology, based on Linux Trustix, completed six months of beta testing in February and is now being piloted with customers. "We're approaching about 500 real estate closings a week" using the secure Linux technology, Robert says. ◆

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10 Hot SKILLS FOR 2013

Want to snag a pay premium? Check out the IT skills that will be in high demand in 2013.

BY MARY K. PRATT

[redacted]

THE NUMBER OF COMPANIES planning to hire tech professionals continues to grow, with 33% of the 334 IT executives who responded to *Computerworld*'s 2013 Forecast survey saying they plan to increase head count in the next 12 months.

This is the third year in a row that the percentage of respondents with hiring plans has risen — up from 29% last year, 23% in 2010 and 20% in 2009.

"When you look at just about any research or market trend, IT is one of the top two or three always mentioned as a bright spot in the job market, and it's pretty simple why," says John Reed, senior executive director at staffing firm Robert Half Technology. "When you look at technology, it drives so much of what business does, from productivity to communication to improving speed to making better business decisions. So companies are investing in that, and you have to have the people experienced in doing that."

Of course, IT leaders aren't hiring technologists indiscriminately. They're seeking specific skills to deliver what the business needs to compete today. Here's a look at the top 10 skills for 2013.

1 Programming and Application Development

■ *60% plan to hire for this skill in the next 12 months.*

Companies put off projects during the recession, but now they're playing catch-up and looking for staff to keep up, according to Reed.

"Technology and software are great ways for companies to improve productivity, lower costs and create better Web presence," he says, adding that companies will need staffers to create new and better technology to do those things.

That's the case at San Francisco-based Wells Fargo, says Jason Griffin, vice president and technology talent acquisition manager. "Our top needs are in programming and application development," he says. "We're just looking for more to meet the business need. The business [units] are

DIANE MACDONALD / GETTY IMAGES

investing in new products, they're looking for ways to provide products and services to meet customer needs."

Griffin, like others, says he's specifically looking for people with experience in Java, J2EE and .Net.

2 Project Management

40% plan to hire for this skill in the next 12 months.

The ongoing need for project management skills tracks with the continuing need for programmers: Both are responses to the demand for new applications that businesses need to compete.

"More projects mean more project managers," Reed says, noting that companies want experience as well as credentials, such as the Project Management Professional designation.

Jamie Hamilton, vice president of software engineering at Detroit-based Quicken Loans, says project manager jobs will be among the 100 new positions his company plans to add to its 800-strong IT team.

Hamilton says demand for project managers is strong in part because projects are growing more complex as the connectivity between applications increases.

Successful candidates need to have proven track records. "Three things are key for us, and they're more around behavior: Are you a leader, and do you operate as a leader? Do you have a history of executing? What's your behavior around detail?" Hamilton says.

3 Help Desk/Technical Support

35% plan to hire for this skill in the next 12 months.

Jack Wolf, vice president and CIO at Montefiore Medical Center in New York, says he has a list of initiatives to pursue, including deployments of new radiology systems and electronic health record applications. To ensure success, he's looking not only for people to build and implement the systems, but also for tech support workers to help employees use them.

"New systems mean you need more help desk people to handle the increase in calls we expect," Wolf says.

He's far from the only one searching for such skills. Tech staffing firm Modis reports that help desk technician is the job title that companies most often seek help filling.

4 Security

27% plan hire for this skill in the next 12 months.

Security has long been a concern of IT leaders, and demand for specialized security professionals is growing as the task of safeguarding systems and data becomes increasingly complex.

Consider the case of Netherlands-based Royal Philips Electronics, which has U.S. headquarters in Andover, Mass.

Cynthia Burkhardt, vice president of talent acquisition, says the company is building its IT security department internationally. It hired a chief information security officer, who is based in the Netherlands, and it's adding four more IT security executives — two of whom will be based in the U.S. She says the company expects to continue building its IT security team from the top down.

Burkhardt says Royal Philips wants experienced IT security professionals who have business acumen in addition to expertise in deploying firewalls, threat detection tools, encryption technology and other security systems.

5 Business Intelligence/ Analytics

26% plan to hire for this skill in the next 12 months.

Big data is one of the top priorities for many companies, but getting the right people to analyze all that information is challenging, says Jerry Luftman, managing director at the Global Institute for IT Management and a leader in the Society for Information Management.

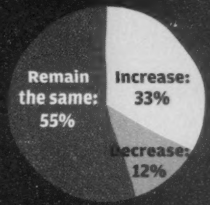
The best candidates have technical know-how, business knowledge and strong statistical and mathematical backgrounds — an uncommon mix of skills, Luftman says. In fact, some companies are hiring statisticians and teaching them about technology and business.

Joe Fuller, CIO at Dominion Enterprises, a marketing services company in Norfolk, Va., says he anticipates hiring data scientists or data analysts in the future but acknowledges that it will be a challenge.

"We're missing that person who thinks outside the box, who understands the link between this behavior now and this behavior later," Fuller says. "I don't know who to look for there, so I think it's [going to be] a team. I can't imagine finding that in one person."

HIRING POPS UP

What changes do you expect in your IT employee head count in the next 12 months?



TOUGH TO FIND

Which of these skills will be most difficult to hire for?

Programming/application development	32%
Security	11%
Project management	10%
Cloud/SaaS	8%
Business intelligence/ analytics	7%

TALENT DISPERSED

What IT skills are being embedded in the business departments at your organization, whether in the form of IT personnel or as IT skills performed by business unit staff?

Project management	38%
Business intelligence/ analytics	29%
Help desk/technical support	25%
Security	24%
Programming/application development	23%

TRAINING LEVEL

How would you describe your organization's investment in training to help staffers manage the fast-changing IT field?

Same level as previous years	40%
More investment than ever before	26%
Less than in previous years	18%
Staffers must invest in their own training	16%

SOURCE: *COMPUTERWORLD'S* 2013 FORECAST SURVEY OF 334 IT EXECUTIVES, JUNE 2012

6 Cloud/SaaS

25% plan to hire for this skill in the next 12 months.

Fuller's staffing plan at Dominion Enterprises is also a case study for skill No. 6, which didn't even crack the top 10 in the 2011 survey: He says the company will need cloud computing experts as it moves beyond its two existing data centers.

"We're going to need a cloud architect who knows how to leverage and how to architect without breaking the bank," he says. "We're going to need to know where we should host it, how to configure it, how to negotiate the [service-level agreements], and to make sure we're backed up properly."

7 Virtualization

24% plan to hire for this skill in the next 12 months.

Jon A. Biskner, assistant vice president of IT at Nicolet National Bank in Green Bay, Wis., says he wants to create a virtualization administrator position.

"It's hard to find someone who is fully skilled in virtualization," Biskner says. "They have to understand the storage and clusters behind the virtual server because before the connection was more physical; now it's more logical." IT professionals talk about virtualization, he adds, but often they don't have a breadth of experience with it.

8 Networking

19% plan to hire for this skill in the next 12 months.

Networking expertise remains a perennial top 10 most-wanted skill, although demand has dropped from 38% in the 2010 survey to 19% in the 2013 survey. Despite the decline, however, IT leaders say they still need networking professionals who have solid experience.

In Robert Half Technology's third-quarter IT Hiring Index and Skills Report, network administration was the No. 2 most sought-after skill set, cited by 48% of the 1,400 CIOs surveyed. It was second only to data/database management, which was cited by 55% of the respondents.

9 Mobile Applications and Device Management

19% plan to hire for this skill in the next 12 months.

As consumer and business use of smartphones and tablets expands, employers are looking for workers who can handle the demands related to the proliferation of such devices, says Motti Fine, managing director of TreeTop Technologies, an IT staffing and consulting firm. Case in point: Kathy Junod, senior director of IT at Auxilium Pharmaceuticals in Malvern, Pa., plans to create a new job with the title mobile manager to add to her existing staff of 22. She says she needs an experienced manager to oversee building the niche mobile apps the business needs.

10 Data Center

16% plan to hire for this skill in the next 12 months.

Core technical skills remain in high demand, so it's not surprising that data center skills still make the top 10. In fact, CompTIA reported in its February State of the IT Skills Gap study that server/data center management and storage and data backup remain high on the list of IT skills that employers are seeking. Some 61% of the IT and business executives surveyed by CompTIA rated server/data center management as a very important skill, while 57% rated storage/data backup as such.

However, Robert Half Technology's third-quarter IT Hiring Index and Skills Report found that CIOs listed data/database management as No. 2 among the "functional areas" in which it's most challenging to hire IT professionals. ◆

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Hiring Trends: Stuck in a Recession Mindset?

AN INCREASING NUMBER of IT executives say they plan to hire, yet when asked in the Forecast 2013 survey about their companies' business priorities, attracting new talent came in dead last.

Motti Fine, managing director of TreeTop Technologies, explains the dichotomy, saying that companies think they can afford to be choosy.

"Companies can do with an open position for some time," Fine says. "Are we getting to a point where that could be problematic? Hopefully, but we don't see any sense of urgency yet."

A change could be under way, however.

ManpowerGroup's seventh annual Talent Shortage Survey, released in May, found that 49% of U.S. employers are having trouble filling mission-critical positions. It also found that IT staff is the third-hardest job category to fill in 2012.

Jack Cullen, president of tech staffing firm Modis, says companies are looking for ideal candidates that simply don't exist. "That's because people have a recession mindset," he says.

But they're going to have to break out of that mentality, he adds – or miss out on great hires. "Today, there's limited talent available, and when it's available, you have to move quickly because you're not the only person looking at that talent," Cullen explains. "People will have to realize that there isn't the ideal out there, that if they see someone they like, they have to pull that trigger. And I think we're going to see that, see the interview process shortened as we go into 2013, because everything is supply and demand. Right now, demand outpaces supply for IT positions. And coming into the fall – those are strong months for hiring – I expect we'll see those quicker decisions."

– MARY K. PRATT

A CALCULATED Risk

As mobile devices continue to flood into the enterprise, IT leaders grapple with ways to manage the risk. **BY BOB VIOLINO**

[redacted]

IF YOU'RE CIO AT A LARGE ENTERPRISE — or a small one, for that matter — chances are good that you're seeing a steady rise in the number of employees using smartphones and tablets at work.

The upside of this trend is that people might be more productive if they're using mobile devices they're comfortable with to access corporate data, collaborate with colleagues and communicate with customers. But increased mobility comes with risks.

Smart IT executives are mapping out strategies for managing their organizations' mobile risks and benefits. More than half (52%) of the 334 IT executives who responded to *Computerworld's* 2013 Forecast survey said they're ramping up mobile risk management efforts, and more than one-third (38%) said they're seeking help from outside providers.

Yet the results also show that many organizations haven't yet adopted a formal mobile device management strategy. Only 46% of the respondents said they have such a plan in place.

Those companies that have launched mobile strategies are getting a handle on the risks. Chicopee Savings Bank in Chicopee, Mass., with seven branches in western Massachusetts, began deploying Windows smartphones about five years ago and has since moved to Android devices.

"We initially deployed these devices to meet the business need of keeping corporate email, contacts and calendaring continually available to a small subset of our executive, sales and support employees — whether they were in or out of the office," says Darlene Libiszewski, senior vice president of IT.

The bank launched an assessment to identify the risks and benefits of mobile devices. "A formal risk management discipline has always driven where we invest our resources," Libiszewski says.

Confidential information residing on mobile devices was among the security risks. "To minimize the risk effectively, we realized we needed to own the device to implement and manage the controls," she says.

But to minimize the cost of deploying smartphones, the bank is now considering adopting a bring-your-own-device (BYOD) program.

JULIAN HAWKINS / GETTY IMAGES

Managing risk is an ongoing process, Libiszewski says. "But I would say that more risk management focus has been placed in the mobile space because it is developing so rapidly and customer adoption is huge — and face it, this space is the new frontier to be exploited," she adds.

Technology Plays Enforcer

Technology plays a huge role in helping IT manage devices and maintain security. Georgetown Hospital System, a healthcare provider in Georgetown, S.C., relies heavily on systems such as BlackBerry Enterprise Server, Microsoft Exchange Server and mobile device management technology from AirWatch to safeguard mobile devices such as Apple iPads and iPhones, Android smartphones and RIM BlackBerries.

"The phones are primarily used for email and calendar access, and they're used by senior administration, managers and approved employees [who] either travel or work on-call schedules," says CIO Frank Scafidi. Tablets are used mainly by managers and senior administrators, and increasingly by doctors, to access applications.

The AirWatch product, which Georgetown deployed in 2010, enables IT to place restrictions on devices, enforce security policies, remotely secure and wipe devices, and monitor usage, Scafidi says. The organization plans to move BlackBerry users to the AirWatch environment and decommission the BlackBerry server to maintain a unified mobile management environment, Scafidi says.

In addition to deploying security technologies, companies are developing policies on appropriate use of mobile devices. HomeTown Bank in Roanoke, Va., four years ago implemented a customer information security and acceptable use policy that outlines the bank's mobile device strategy. The bank is required by law to have employees review and accept the policy annually, says Michael Wright, vice president and director of IT.

The policy "is designed to educate bank employees on customer information and security awareness," Wright says. "It's kind of a living document" that evolves as mobile technology changes. It also requires that users implement features such as locking mechanisms and encryption for certain types of sensitive information.

Users of devices such as iPads must agree to let the bank remotely reset and wipe data on devices if necessary. Only individuals in the company who require access to corporate email to do their jobs have access to the network via mobile devices, Wright says. All devices that have access to corporate email must have a locking mechanism so that repeated failed attempts to guess a PIN will wipe the device.

Getting Prepared

Looking ahead to 2013, IT executives will continue efforts to use available tools and services to reduce the risk from mobile devices.

"I anticipate BYOD being an area of focus in 2013, and therefore I may seek help with anything from writing the policy to evaluating and implementing solutions for mobile device firewalls, [antivirus tools] and management software," says Libiszewski.

HomeTown Bank plans to use a software-as-a-service mobile device management tool to ensure that devices are being used properly. The software will let the bank define PIN requirements, remove an application from a device remotely or perform a full data wipe if needed, says Wright.

The bank will also conduct annual refresher training on the minimum requirements for device security and regulatory compliance for employees with devices that access corporate email. In addition, it will provide ongoing education on social engineering techniques, malware avoidance and acceptable use.

Organizations in the coming year will be looking for more management tools to help ensure document security and network security without infringing on employees' privacy or asking them to change their normal patterns of using devices, says Vishal Jain, a mobile services analyst at 451 Research.

"We think mobile security, app management, intelligence and threat detection will be in demand," Jain says.

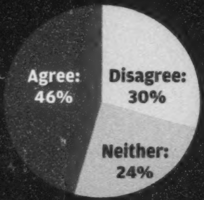
The risks associated with mobility will only increase as more people bring their own devices to work and threats become more sophisticated. "The biggest threat that enterprises face is the loss or theft of devices containing enterprise data," he says.

It's vital to have a formal mobile risk strategy and include that as a part of information security guidelines, says Jain, noting that "employees are already bringing devices to [the] workplace," essentially creating "unmanaged BYOD programs." ◆

Violino *is a freelance writer in Massapequa Park, N.Y. You can reach him at bviolino@optonline.net.*

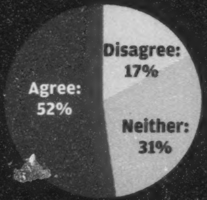
SETTING THE STAGE

We have a formal mobile device management strategy.



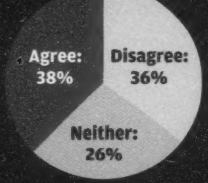
PRIMING THE PUMP

We have ramped up our risk management efforts.



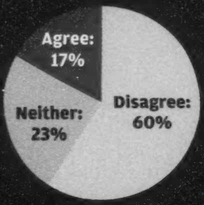
LOOKING FOR HELP

We are working with third parties to reduce risk.



KEEPING A WATCHFUL EYE

We have shelved security concerns in order to embrace the greater goals of the company.



SOURCE: *COMPUTERWORLD'S* 2013 FORECAST SURVEY OF 334 IT EXECUTIVES, JUNE 2012

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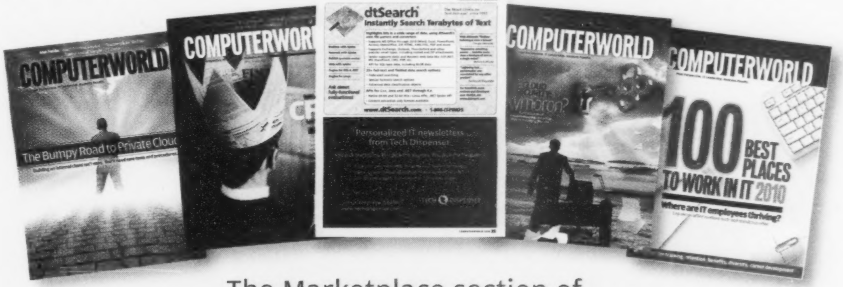
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Source: *Harvey Ad Measurement Study,
Computerworld May 10, 2010

THORNTON A. MAY

Forecasting a Year for Stories and Storytellers

> IT executives will be increasingly evaluated on their ability to create second-horizon businesses.

HERE'S MY NO. 1 FORECAST FOR 2013: We will start telling better stories. In the new year, the IT career guillotine will sever the necks of those less facile in the narrative arts. The technology industry in general and IT leaders in particular desperately need to tell more compelling, actionable and understandable stories about the future. In a word, we need to become better forecasters. 2013 will be the year technologists rediscover storytelling. The person with the best narrative about the future wins.

We will craft scenarios of what the future might look like. We will start to dream again, to envision worlds that take full advantage of the technology wonders available to us. And lest we be accused of being lotus-eating, silicon-worshipping Utopians, we will also give voice and visibility to things that we *don't* want to happen (e.g., data breaches and outages). We will articulate the costs and prophylactic preparations required to make sure that to-be-avoided scenarios are in fact avoided.

A respected Harvard Business School professor, lecturing a group of healthcare innovators, recently opined, "The only thing I know when someone brings me a business plan . . . is that it is wrong." This statement embodies an industrywide misunderstanding of the process of forecasting and the role of forecasters. The focus and measure of a forecast and a forecaster should not be accuracy alone; behavior change must also be taken into account. Accurate forecasts that fail to get something valuable started or something stupid stopped are just so much noise.

It was said that when Cicero spoke, audiences wept. But when Caesar spoke, *men marched.* 2013 will be the year of forecasts that get IT marching.

Forecast No. 2: IT is going to get its entrepreneurial freak on. In other words, IT needs to use technology to create value. The stories CEOs and boards of directors want to hear are how IT grew the top line (or, in the not-for-profit sector, how IT achieved or expanded the mission). IT executives will be increasingly evaluated on their ability to generate revenue and create second-horizon businesses.

In 2013, boards will be watching whether in-place IT is capable of doing something with technology that differentiates and creates value.

Forecast No. 3: Vendor gibberish will be outed. The power of storytelling will manifest itself on the vendor side of the equation as well. IT decision-makers on the buy side will start to score the narratives of their strategic partners. Many a CIO has emerged frustrated and confused from "technology road map briefings" with vendors. Much of the slideware being humped around meeting rooms today borders on gibberish. Historically, this dissatisfaction with poor vendor messaging has remained internal to the enterprise. This will change in 2013.

Forecast No. 4: IT leaders will gossip. News flash for the vendor community: CIOs talk. They talk a lot and with an expanded array of people about future IT investments. High-performance CIOs will involve university faculty, thought leaders and other members of the value ecosystem to evaluate partner "pitches." It has never been easier or more important to get a second opinion on major technology investments and partnerships.

In the IT space, there has been a shortage of words that stir the imagination. Let's hope 2013 changes that. ◆

Thornton A. May is author of *The New Know: Innovation Powered by Analytics* and executive director of the IT Leadership Academy at Florida State College in Jacksonville. You can contact him at thorntonamay@aol.com or follow him on Twitter (@deanitla).

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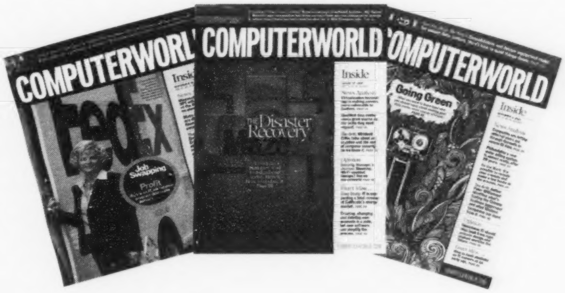

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Nobel Biocare has openings in Mahwah, NJ:

Product Support Specialist - Provide tech. support to external customers & internal operating depts. on co. products, incl. innovative restorative & esthetic dental solutions & dental implant technology (Ref. # CG01).

Manager, Technical Products and Systems - Resp. for the tech. product mgmt. of software for dental CAD/CAM systems, incl. NobelProcera & Procera (Ref. #RO01).

Senior Systems Analyst, SAP - Analyze science, engineering & business problems to implement & improve computer sys. Provide expertise w/in SAP PP/MM & supported business processes. Work on projects at unanticipated client sites in the U.S. and overseas up to 10% of time. (Ref. #PK01).

Please mail resume to A.Wheeldon, Nobel Biocare Procera, LLC, 800 Corporate Drive, Mahwah, NJ 07430.& incl. Ref. #)

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job #below:

New Business Dev. Manager (Mountain View, CA); **#1615.1675**; Manage Google's high-impact strategic content partnerships. Exp incl: web & mobile technologies; lead negotiations of commercial trans with companies in int'l mkts; legal aspects of business dvlpmnt contracts,; lead int'l teams & interaction with C-level exec.

User Interface Designer (Mountain View, CA); **#1615.516**; Define the user model and user interface for new and existing Google products and features. Exp incl: Photoshop; Illustrator; user experience; UI; page design; & information architecture.

SW Eng Positions (Mountain View, CA):

Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.1851; Java & C++; oo design; NoSQL database; mach learn; test-driven dvlpmnt; data mining; & MapReduce.

#1615.1315; C & C++; concurrent program; L2, L3, & L4 ntwrkng dvlpmnt; large-scale distrib syst theory & dvlpmnt; large-scale data center architect & topology design; SDN concepts & OpenFlow protocol & technologies; & analysis of algorithms & complexity

#1615.507; C or C++; Python; large scale data process & storage syst; concurrent program; distrib syst perf & resource mgmnt; Linux & kernel perf mgmnt; & RPCs

#1615.453; multithread program; STL; large-scale data process using tools such as Hadoop & HDFS; design, implement, debug, & perf analysis of large-scale distrib syst in C++;& common algorithms.

#1615.651; Jscript; Python; HTML, CSS, & AJAX; C & C++; R & SQL data analysis tools; optimiz statistical methods; error-correction algorithms; data structures, combinatorics, & graph theory; technical comm through publications & oralpresentations.

#1615.951; C, C++, or Java; design, application dvlpmnt, debug & testing; dvlpmnt of multimedia related applications on mobile devices; sensors on mobile platform; & computer vision, pattern recognition, stats, signal process & on-device sensors, and mach learn.

#1615.2558; C & C++; Python; STL; large scale distrib syst; NoSQL class large-scale storage syst; & parallel comput primitives incl MapReduce or Hadoop.

#1615.1975; sw eng'ng; web technology; C++; Java; Jscript; Python; HTML; CSS; adv algorithms & data structures; HTTP; sw design & dvlpmnt; oo program; web application dvlpmnt; syst test; functional test; MapReduce; & NoSQL database.

IT|careers

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SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.3715; Java based oo design & design patterns; distrib data struct; multithread & concurrency arch; distrib & cloud computing; svc oriented arch; scalable fault tolerance; & performant design & solutions.

#1615.939; large distrib codebase; C++; HTML, Jscript, CSS & MySQL; adv algorithms; mach learn; & image process.

#1615.740; Java, Jscript, Python, SQL & Linux shell program; large scale web appl dvlpmnt; large scale data storage & index; database sharding, hashing, & DHT; dynamic web frontend dvlpmnt & perf turning; dynamic program; info retrieval & version mgmnt; & parallel & distrib computing.

#1615.3733; C++, Python, & Jscript; web appl dvlpmnt; cloud-based appl dvlpmnt & deployment; multi-thread; TCP/IP ntwrkng; test-driven dvlpmnt; & algorithms

#1615.4049; C or C++; Bash or Python; Unix or Linux; & algorithms or mach learn.

#1615.1854; oo program; C++, Python, SQL; test & debugging; maint of fail-safe syst; Linux or other Unix-based op syst; database mgmnt sys concepts; & design & implement of large-scale distrib syst, algorithms, & end-to-end technical sys.

#1615.3698; Java; Jscript; GWT; HTML; CSS; XML; RPC; Java Servlet; SQL; JUnit; Java appl & design patterns; oo analysis & design; UI design & implement; & Agile dvlpmnt method.

#1615.3297; mach learn; large scale distrib syst; & C++.

#1615.4479; XML; dvlpmnt in Linux environ; oo programin C++ or Java; data struc & algorithms; databases; web based front end dvlpmnt; & design, dvlpmnt,& support of large scale, fault-tolerant, high perf distrib syst.

GIS Data Engineer (Mountain View, CA);**#1615.2605**; Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include: geospatial data process & programmatic visualization in web environ.

Security Engineer (Mountain View, CA); **#1615.3429** Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include: reverse eng'g; malware analysis; & sw dvlpmnt in Java, Python & C.

Software Engineer (Irvine, CA): Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job #below: Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp incl: **#1615.865**- oo lang; design patterns in Java & C+ multithread, parallel & distributed programming; SQL & bash script; parallel & distributed data structures & algorithms for massive data; design of high perf parallel algorithms; & distrib database syst.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:

Ad Serving Solutions Consultant (NY,NY); **#1615.1318**; Function as the internal or client-facing Google product expert. Exp. incl: enterprise client svcs for tech prod; consult & proj mgmnt for enterprise syst; web technology, incl HTML, Jscript, SQL, HTTP Protocols, API Web svcs, PHP, Python, & AJAX; lead cross-funct teams & drive projects delivery; digital ads or publishing.

Product Manager, (NY, NY) **#1615.3623**; Take responsibility for Google products from conception to launch. Exp incl: tech prod & svcs; dvlpmnt of products from concept to launch; & cross-functional mgmnt.

Quality Assurance Analyst; New York, NY; **#1615.4694**; dev & maintain Google's automated test plans & test mgmnt framework. Exp incl: implement of performance test scenarios; QA test processes, incl test plan, dvlpmnt, & exec; QA methodologies, incl SDLC ; QA tools, incl Agile; perf/load test, incl unit, integration, & funct test in an enterprise environ; test pltfrm functionalities in multi industries interfacing w/ major payment ntwrks; dvlpmnt of automation test frmewrk; Java-based environ & server-side monitor; white box test; JMeter; soapUI; IDE; CSS; HTML; SQL; XML; & oo sw.

SW Eng Positions (NY, NY): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. incl:

#1615.565: C++; multi-thread; parallel program; syst scalability; & perf analysis & bottleneck id in large-scale distrib sys.

#1615.3791 - data struct & algorithms; distrib computing; large-scale syst design; multithread; & database design.

#1615.1159 - C++; STL; large-scale data analysis; & parallel computing.

#1615.3959 - C++; multi-thread appl; data struct; algorithms; design patterns;& networking & web tech.

❖

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:

SW Eng Position (CAMBRIDGE, MA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include: **#1615.1655**; ntwrk protocol modeling, analysis, design, debug, & implement physical deployments; ntwrk emulation, simulation, & testbed perf benchmarking; stat analysis of experimental data; high-perf, multithread, & asynchronous prog in C & C++; Internet protocol suite, incl TCP/IP, DNS, HTTP, & TLS; wireless commun; perf issues of wireless ntwrks; ntwrk prog in Windows & POSIX; & kernel ntwrk prog in Linux or Android.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:

Business Systems Integrator (Mountain View, CA); **#1615.2830**: Design analytical solutions that provide data to answer complex business decisions. Exp. Incl: C++; Java; SQL; data struct; algorithms; complexity analysis; big data, info retriev, data mining, or mach learn; analysis & troubleshoot large-scale distrib syst; large syst sw design; datawrhse or databases; & Unix & Shell.

SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.2154: C++; data struct; algorithms; sw design; & high perform cluster compute.

#1615.2283: C++; multithread; adv algorithms & data struct; parallel program; translation of specs to design & implement complex syst; unit & integrat syst; large-scale distrib syst; distrib database; design fault tolerant & recovery methods; MapReduce; & lead teams of sw eng.

#1615.847: C++ oo design; multithread; STL; Java; Python; SQL; large-scale date storage; index; distrib syst schedul, load balance, & error handle; algorithm design & analysis, incl search, ntwrk optimiz, expression parsing, & eval; & mach learn & stat methods for ads selection & eval.

#1615.536: program in C; design, implement, test, & maint of large syst; Python; large sys sw design & dvlpmnt; Unix & Linux; comp sci, data struct, algorithms, & sw design; & parallel algorithms & scalability.

#1615.1820: syst designs, data struct, adv algorithms, & compilers; complexity data process, AI & data mining; analysis & troubleshoot computer sci proj; C or C++; STL; & script lang, eg Python or Shell Script.

Support Eng. Position

#1615.1905 Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include: algorithms; data struct; and oo lang, eg Java, C++, or Python.

❖

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SW Eng Position (Boulder, CO): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.535; Java or C++; oo design & program; debug; Jscript; web appl design, incl HTML, CSS, & Servlets; source version control; concurrent prog techniques; digital security; & scalable multiuse syst.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:

Product Manager Postion (San Bruno, CA);

#1615.499; Take responsibility for Google product from conception to launch. Exp incl: enterprise or consumer prod mgmnt/product dvlpmnt; collect user rqrmnts for dvlpmnt of product plan & vision; business model, analysis, & predictions on large sets of data; & coordinate cross-funct teams across groups, eg mrktng, prod dvlpmnt & policy/legal. Req technical undergraduate degree.

Software Engineer Position (San Bruno, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects.

Exp incl:

#1615.3611 -C++, STL, Jscript, HTML, CSS, AJAX, Python, SQL, & HTTP; design web server appl; large-scale data index; parallel & distrib computing; distrib database syst; & user log analysis.

#1615.527- C++ & UI design & implement; dvlpmnt & design of large sw syst; & engine dvlpmnt for game console platform.

#1615.2826- Java; Python; Jscript;MySQL; & dvlpmnt & design of large sw syst.

Test Eng. Postion (San Bruno, CA)

#1615.3713 - Design, develop, modify, and/or test hardware needed for various internet search engine company projects. Exp. include: Java, Python, or C#; test methodologies; write test plans; create test cases; & debug.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below.

SW Eng Positions (Pittsburgh, PA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects.Exp. include: # **1615.1032**; oo pro-gram; Unix ; script lang; mach learn algorithms; algorithm designs & data struct; modern parallel comput arch; distrib syst design; & scalable data process.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below: SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.1241 dvlpmnt of maintainable sw; Java & oodesign; SQL & databases; algorithm design & analysis; & computational complexity of different sequential & parallel computational schemes.

#1615.3948 design & implement of high-loaded web syst; Python, Jscript, HTML5, & CSS3; SQL; NOSQL Databases; creation of REST/SOAP web svcs; RPCs; & creation of complex front-end applic in Jscript using Service Oriented Archit approach.

#1615.1252 oo patterns incl C++ & Python; internals of relational database syst; SQL; large-scale distrib database syst; profile & perform tuning of parallel & distr applications; & design & dvlpmnt of concurrent & multi-thread libraries & tools

#1615.2147 operat syst; algorithm dvlpmnt; oo design; sw syst design; design patterns; & C/ C++.

#1615.477 C++; multithread program; performance optimiz; & 3D graphics program, mobile OS dvlpmnt.

#1615.3277; infrastructure for large scale syst incl MapReduce; large-scale shared database mgmnt syst online transaction process syst; small to medium-sized projects from end-to-end; design, dvlpmnt, & deploy large-scale user facing syst; revision control tools such as perforce; C++; Java; Python; & SQL.

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SW Engineer Position (Venice, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp incl:

#1615.637; algorithm & pipeline design for large-scale syst; design,dvlpmnt & release of computer sw & internet svcs; database & datawrhse design, dvlpmnt & test; high-dimension query process algorithms; distrib computing; UI dvlpmnt; info retrieval on large scale real time data; design & appl of mach learn models on text analysis; cross source data analysis;& stat data analysis.

#1615.1139: client prod dvlpmnt; design & implement C++ modules in multithread appl; data struct, algorithms, & sw design; dvlpmnt of Windows appl using ATL/COM, Win32 API, GDI, Microsoft Ntwrkng & Graphic technologies; & dvlpmnt of web appl using Jscript, HTML, DOM, CSS, & XML.

Team Lead (Princeton) NJ: Create project plans and work schedules to meet client's requirements. Automate and improve existing systems and review computer system capabilities, work-flow, scheduling limitations and priorities. Apply in duplicate to Exuberant, INC., 100 Overlook Center, 2nd floor, Princeton, NJ 08540.

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Senior Technical Account Manager; Mountain View, CA; **#1615.1071** Manage tech prog. For Google. Exp. incl: hw eng'g dvlpmnt; script lang; create presentations, spreadsheet models & process document; & cross-function teams that span offices, countries & companies; silicon chip & sw eng'g dvlpmnt process; cryptography& cryptographic algorithms; internet ntwrk topographies & mgmnt protocols; standard computer hw & sw architect; & website dvlpmnt.

SW Eng Positions (Mountain View, CA):

Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.570 distributed computing; mach learn; data analysis; math model & optimization; & C++, Python, & Shell Script.

#1615.2288 model server design pattern; distrib & component syst; load balancing, fault tolerance & security; ntwrk protocols; distrib syst archit; oper syst; multi-tiered archit; & web dvlpmnt.

#1615.549 display ads; SQL; Jscript, Perl or Python; oo programming in Java or C++; Unix/Linux; distrib syst; design, dvlpmnt, production deploy & oper large scale data pipelines; MapReduce paradigm with Hadoop; & large scale unstructured data process.

#1615.2941 Java &/or C/C++, &/or Jscript; Linux/Unix; applic security & authentication protocols; pltfrm hardening & testing; & large-scale production sw sys troubleshoot.

#1615.1093 Java, C++, & Python; Linux OS; version control syst; & image processing or mach learn.

# 1615.1349; mach learn; natural lang process; theoretical comp algorithms; dynamic program & graph theory; oo program; & Java.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below:

Product Manager, Positions (Mountain View, CA): Take responsibility for Google product from conception to launch. Exp.incl:

#1615.574; dvlpmnt or design of proj for mobile, high tech& telecomm industry; strategic dvlpmnt plan; Excel, incl Pivot Table, Vlook-up & VBA macros; & Powerpoint presentations.

#1615.964; online monetization (internet ads) for product, svc or ntwrk via text, display & rich media ads; design, dvlp & release of computer sw & internet svc; prog mgmnt with sw design eng; & algorithms, distrib computing, & UI. Up to 25% travel req'd.

Mechanical Engineer (Mountain View, CA); **#1615.2009**: Design & build sw, hw, computing platforms and ntwrkng tech. Exp incl: cooling strategies; solid mechanics & structural design; syst reliability using Markov Chain Monte Carlo; & op/non-op shock/vibe issues.

SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects.

Exp. include:

#1615.2759; Java, design of UI for mobile appl, Python & Shell scripts, perf analysis, user log analysis, analytics to diagnose test failures & production issues, & design docs.

#1615.1927; large scale distrib syst design & implement; UX &/or HCI analysis on frontend for web property.

#1615.1205; distrib syst prog; script prog; C++; concurrency &/or multithread prog; data struct; & algorithm design & analysis techniques.

#1615.3665; C++; SQL script lang; debug components; large scale relational model; & data analysis.

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Hardware Engineer (Mountain View, CA); **#1615.552** Design, develop, modify, and/or test hardware needed for various internet search engine company projects. Exp. Incl: solidworks & PDM; math modeling of complex syst in Octave & MATLAB; design PCB using Cadence Allegro; & design complex physical & optical syst.

SW Eng Positions (Mountain View, CA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. incl:

#1615.1826 time series data analysis or stat signal process technique; Python or C++; & algorithm design & implement.

#1615.769; oo prog, incl design patterns, best practices, & refactor; transaction syst; sw design, test, integrate, & deployment in production environ; collab w/ cross-function team across different geographies, support customer-face issues; & dvlpmnt of scalable syst.

#1615.2314: C or C++ program; microcontrollers & integrat peripheral syst.

#1615.3745: Java, Jscript, C, or C++; API use or design; web auth & authoriz/security standards; large scale syst design; developr workflow & tools; & cloud relevant technol.

#1615.3765 C++ or Java; SQL; oo design; high-perf/low-latency syst; algorithm design; data struct; databases; full prod dvlpmnt lifecycle & deploy; sw dvlpmnt methodologies, incl Agile prog & test-driven dvlpmnt.

#1615.4756 full-stack eng for web appl; lead eng or product teams creating browser-based appl; Jscript; DOM/CSS; & Python.

#1615.692: Java; multithread, info retrieval & data mine; design patterns, incl dependency injections; oo analysis & design; UI design & implement; web appl & multi-tiered syst; & Linux.

SW Eng in Test Position (Mountain View, CA) **#1615.1912**; Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. incl: C, C++, multithread, & Python; design & use distrib syst & framewrks; test methodology & tools; algorithm & data struct engineer; & databases, ntwrkng, oper syst, file syst, compilers, & hw arch.

Interested candidates send resume to: Google Inc., PO Box 26184 San Francisco, CA 94126 attn: Lisa Harrington. Please reference job # below.

SW Eng Positions (Pittsburgh, PA): Design, develop, modify, and/or test sw needed for various internet search engine co. projects.Exp. include: # **1615.1032**; oo pro-gram; Unix ; script lang; mach learn algorithms; algorithm designs & data struct; modern parallel comput arch; distrib syst design; & scalable data process.

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Portfolio Analyst; Mountain View, CA **#1615.488** Dvlp portfolio mgmnt processes for Google projects. Exp. incl: investment mgmnt or investment consulting; quant, analytical, & finan modeling; Excel; & data mgmnt.

Product Mgr; Mountain View, CA **#1615.320** Take responsibility for Google products from conception to launch. Exp incl: prod mgmnt or product design; dvlpmnt of internet products & tech; social ntwrkng space; mobile social products.

Business Analyst; Mountain View, CA **#1615.730** Define business intelligence technologies for Google. Exp incl: data warehousing; data model; advanced SQL functions to analyze & extract data; databases; adhoc data envrnmnt incl access data from multiple pltfrms; Bus Intelligence Reporting Tools; ETL Tools; mgmnt & organiz of multiple projects; script in Basic Unix or Python; requirement gathering; stakeholder mgmnt; & creation of technical document.

Quantitative Analyst; Mountain View, CA **#1615.491** Lead & perfquant analysis for internet search engine company projects. Exp. incl: application of analytics to solve business probl in operations & analytics consulting roles; R; Python; SQL; Excel; project mgmnt; forecast & plann; & pricing analytics.

SW Eng Positions (Mountain View, CA):

Design, develop, modify, and/or test sw needed for various internet search engine co. projects. Exp. include:

#1615.3824 C++, Python, & Jscript; video compression, muxing, & demuxing; cloud-based application dvlpmnt & deployment; multi-thread; TCP/IP ntwrkng; test-driven dvlpmnt; & algorithms.

#1615.857 syst design & program in an oo lang, such as C++ & Java; query process & index structures for relational & semi-structured data; distributed SQL databases; writing parallel programs using MapReduce; implement query planner & rule-based optimizer, query rewriter, and distributed joins; perform tuning & benchmark; & research & survey latest research literature.

#1615.3712 C/C++; dvlpmnt of distrib syst; multicore & multithread program; & dvlpmnt of comprehensive unit & regression tests.

#1615.2050 web dvlpmnt using Java, Python, & Jscript; large scale data process; scalable data struct & numerical algorithms; & oo dvlpmnt paradigms.

#1615.1074 Jscript patterns & antipatterns; Document Object Model intricacies across browser implement; memory mgmnt within web browser; dependency injection syst; design testable architect; test driven dvlpmnt; & contribution to open source code bases. Up to 20% travel

# 1615.1759; C++; Python; large dataset analysis & mach learn; syst analysis & optimization; & design, creation, deploy, & maintenance of large-scale/high-perf distrib sys.

#1615.1683 Web Mining; mach learn; Info retrieval; C++; Python; & UNIX. Up to 25% travel reqd.

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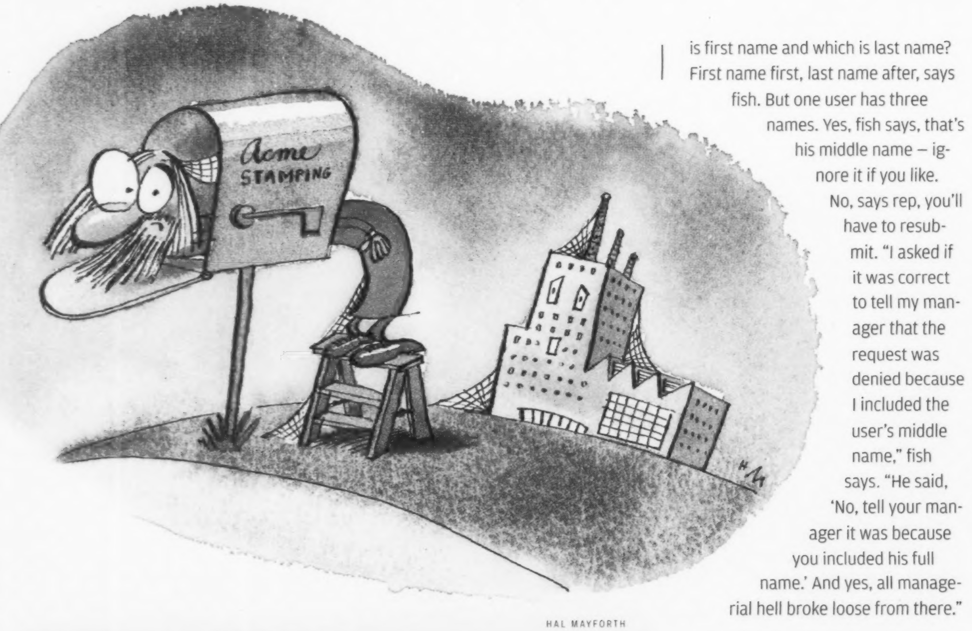

HAL MAYFORTH

Penny Wise, $100 Foolish

It's back in the early days of manufacturing machines being connected to computers, and this pilot fish has a simple task: Replace a failed network card in a metal-stamping machine. And it's important: "This one machine made more money for the company than all of their smaller ones combined," says fish. But he discovers the network card is proprietary and has to be ordered from the manufacturer.

Good news: It's in stock and can be delivered overnight for a total cost of $100. Bad news: The plant manager refuses to approve overnight shipping because he thinks it's a "frivolous" expense. Fish tries to reason with him, but no luck – the card is sent by regular shipping. It takes 15 days to arrive, and production is down on the most valuable machine in the shop for two weeks. Reports fish, "The next time a similar problem occurred, I had full authority to order the parts I needed using overnight shipping – without having to ask anyone's permission."

Because I Said So

Pilot fish has to fill out a security request for some new members of her team, and she knows this security group is *very* particular, so she's especially careful to dot the i's and cross the t's. Not that it helps. "Their representative contacted me saying I had not given the names of the users that needed access, so he was rejecting the request," says fish. The names are right there, fish points out. But which is first name and which is last name? First name first, last name after, says fish. But one user has three names. Yes, fish says, that's his middle name – ignore it if you like.

No, says rep, you'll have to resubmit. "I asked if it was correct to tell my manager that the request was denied because I included the user's middle name," fish says. "He said, 'No, tell your manager it was because you included his full name.' And yes, all managerial hell broke loose from there."

Just Like It Told Me To

This company's VoIP phone system has a Services key that pops up a screen full of options. "It gives users access to a number of applications, such as a calendar, stock price feed, etc.," says a pilot fish on the scene. "As a service to our users, we added an option for contacting our help desk and labeled it 'Call Help Desk.' Some days later, our help desk contact center dropped a ticket in our telecom queue reporting an unspecified phone problem. To get clarification, I picked up the phone, dialed the user and asked her what the problem was. 'Oh, no problem,' she replied. 'I pressed the Services button on my phone and it told me to call the help desk, so that's what I did.' "

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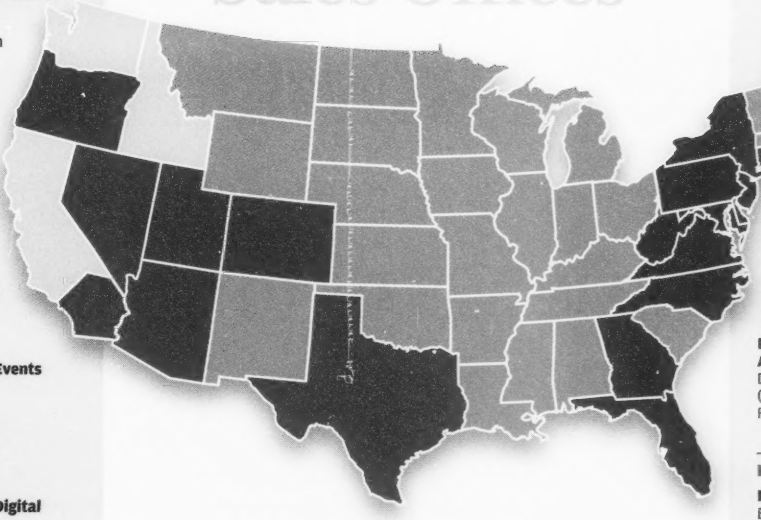

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OPINION

SCOT FINNIE

Mobile Needs to Change

Competition should drive down prices, but that's not happening in the U.S. mobile market.

SUPPOSE YOU HAD TO CHOOSE between your "sit-down" computer (such as a laptop) and your smartphone. I think I know what most of us would keep. Smartphones have become indispensable. They have also become status symbols — the cachet of certain brands and models of mobile products is matched only by designer clothing, cars and a few other types of goods.

Naturally, a product that we've decided we can't do without is going to be profitable for its maker. Unsurprisingly, the tech company with the largest market cap, Apple, derives its largest revenue stream from two mobile devices: the iPhone and the iPad.

Nonetheless, mobile is a dysfunctional industry.

For starters, look at the complexity. The mobile market features a triad made up of device makers, mobile platform providers and wireless carriers. Then look at how each of these operates.

Competition in a free market should drive down prices, but that's not happening in the U.S. mobile market. At full retail, the device makers charge an arm and a leg for products that are underpowered, have little memory and come with anemic batteries. Proprietary platforms, such as Apple's iOS, continually add new features and functionality that eliminate interoperability with competing products and platforms. That's an utterly self-serving model. The top wireless carriers exert too much control over device makers and platform providers and bind end users to two-year contracts with steep monthly charges.

The pace in this market is frantic to the point of distraction. Product cycles are so tight that the marketplace is baffled. Network providers have far too much influence on hardware design and, in the case of Android, too much leeway to customize software. Android's widespread adoption was greatly aided by the fact that Google made it open source, but the fragmented array of options could be the platform's undoing. The user experience isn't the same from device to device and, perhaps more importantly, from app to app. Like the device makers, Google needs to stop iterating Android so frequently and become a leader, not merely a software provider.

Meanwhile, Apple has gone back to building a closed ecosystem in an attempt to lock people into its hardware and software, with iOS as the poster child for this push. This is a mistake; one of the key reasons OS X has done so well is that Apple threw open the doors and built bridges to other systems. Apple shouldn't be going backward.

Some of the dysfunction may be addressed as the mobile market exits its Wild West phase. Smartphone market penetration is now over 48%, according to ComScore — 55%, according to Nielsen. Nielsen says two out of three cellphone buyers now select smartphones. Before long, the adoption growth rate will slow to a modest pace. When that happens, the industry will become more focused on customer retention and, by extension, service.

In the meantime, I'd like to see new regulations imposed on carriers. Companies like Verizon and AT&T have huge networks that are still being built and need regular maintenance, and they also need to make profits. So any regulation would be best done with a light touch. Unfortunately, Washington often lacks a light touch. Balance is needed, since the mobile industry's effect on consumers is too great to ignore and the industry is too important to strangle. But something has to be done about the undue control the carriers have over the mobile market — and over the costs borne by customers. ◆

Scot Finnie is *Computerworld*'s editor in chief. You can contact him at sfinnie@computerworld.com and follow him on Twitter (@ScotFinnie).

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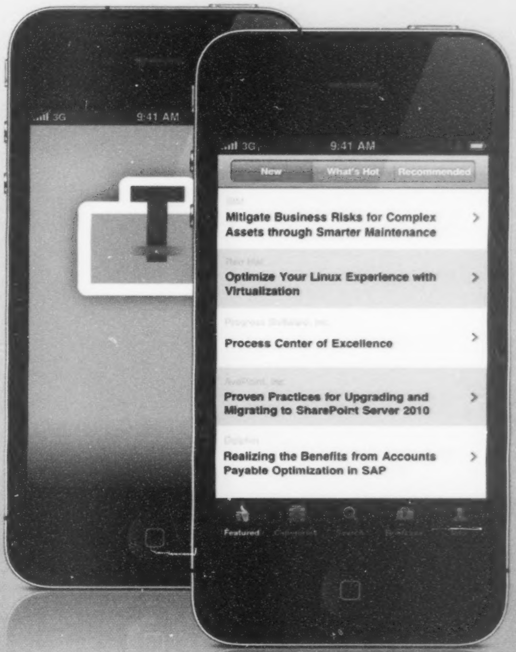

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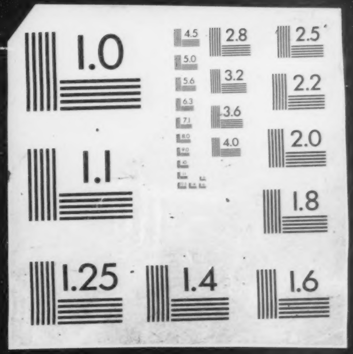
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